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JANUARY, 1956

# PIPE LINE INDUSTRY

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CONSTRUCTION • OPERATIONS • MAINTENANCE

FEB 6 - 1956
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## CONTRACTORS' ISSUE

Construction due to increase 12 percent in 1956 .....Page 22

Pipe Line Contractors Association to meet in Miami .....Page 24

Pipe line construction highlights of 1955 Page 26

How TGT built a pipe line and good will on Main Street ..Page 38

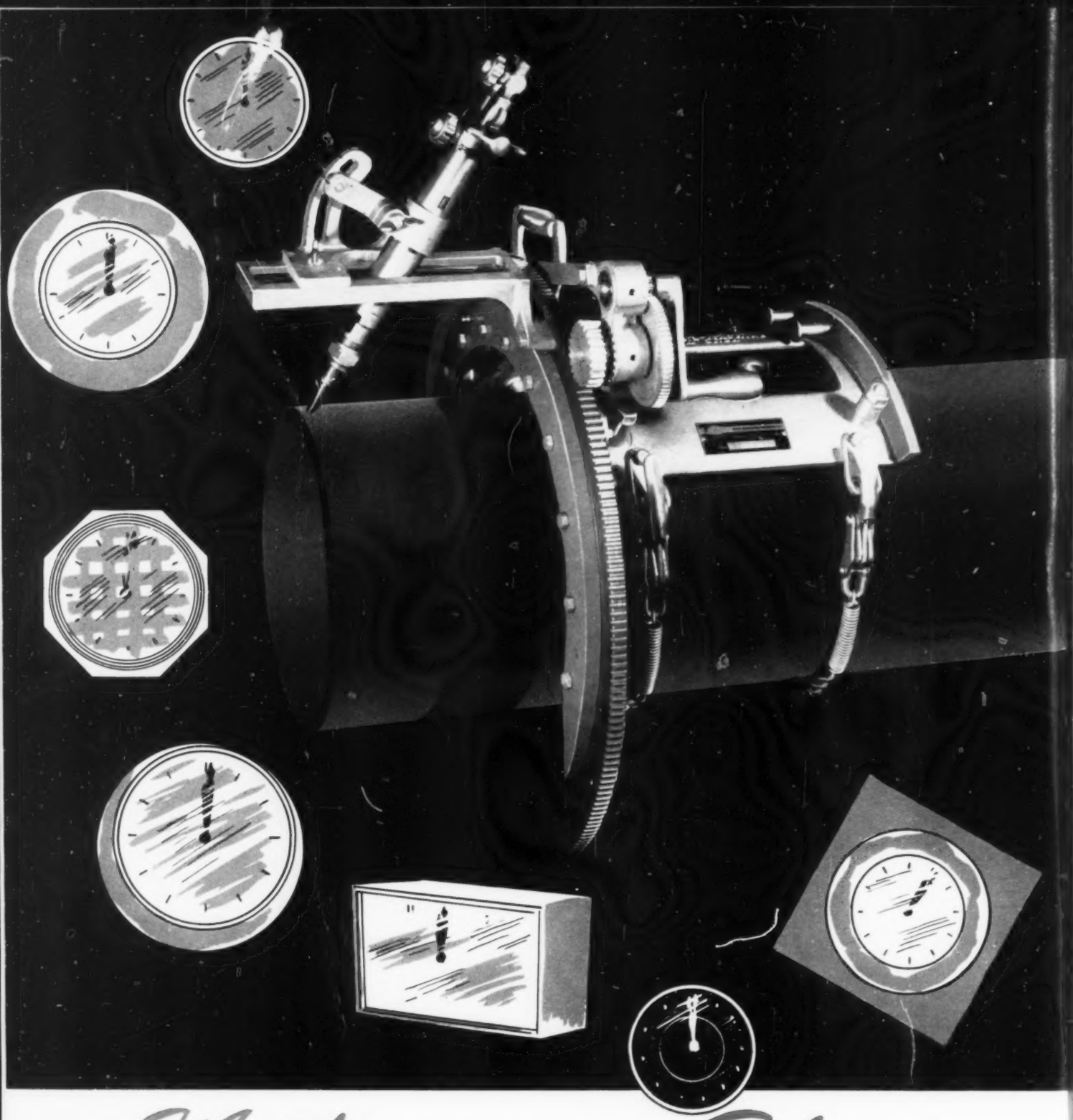
How Transco protects Manhattan meter pier from outside fires Page 34

*Turn the page for additional contents and a quick review of this issue*

$2 per year 50 cents a copy

**THE BIG PUSH**

12 Million Pounds of Pipe Pushed 12 Miles Through Louisiana Swamp



# *Meet* THE TOP *Salesmen*

*The hands of the clock can always help sell a product. Everyone is looking for time — the priceless commodity. Show a customer how to save time and he'll convert that saving to money. H & M Pipe Cutting and Beveling Machines have saved pipeliners and pipe fabricators millions of minutes, amounting to thousands of hours, earning those men hundreds of dollars. Meet the top salesmen for H & M . . . the clocks of the industry.*

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PIPE LINE INDUSTRY

# CONTENTS and Quick Review

January, 1956 Vol. 4, No. 1

**To help you put first things first, scan these time-saving digests, checking ☑ those you want to read first.**


**U. S. Pipe Line Construction Due to Increase 12 Percent in 1956**

☐ Building of more than 18,000 miles of new pipe lines in the U. S. during 1956 is forecast, 12 percent or nearly 2000 more miles than was built in 1955. Big increase anticipated in natural gas construction is expected to more than offset a decrease in crude oil and product pipe line construction. Data are based on annual survey of plans for construction by pipe line companies. Page 22

**Contractors Meet at Boca Raton, Florida**

☐ In only eight years the Pipe Line Contractors Association has accomplished much to benefit the pipe line industry as a whole. Program for the 1956 meeting on January 16-18 features a good look at the future by its own leaders and invited speakers.....Page 24

**New Ideas Brought Pipe Line Progress in 1955**

☐ New ideas continually are being devised in pipe line construction to solve present field problems—and, many times, future ones, too. A variety was used during 1955. Practices with big-inch lines and testing procedures were among the year's advancements.
By Melvin A. Judah.....Page 26

**The Big Push**

☐ One section of American Louisiana's line in south Louisiana brought up a problem—how to lay a 12-mile section of line through the marsh without digging a flotation canal. One contractor solved it by shoving the line a distance of 62,105 feet, including a 28-degree reverse bend, from a high ground work station....Page 32

**How Transco Isolates Outside Fires**

☐ A newly-installed system at Transcontinental's New York City metering station literally will blanket the station with fog less than 30 seconds after a fire is observed in the area. Water purchased from the city's main is distributed by 40 fog nozzles at the rate of 1200 gallons per minute to prevent damage to the vital installation .....Page 34

**Natural Gas Pipe Line's Sunken Gardens**

☐ Natural Gas Pipe Line Company has replaced the buried station manifolds at nine of its stations with new manifold pits. They whipped corrosion and made the piping safer. This was an unusual job since the station had to continue operations during construction..Page 36

**Pipe Line Down Main Street**

☐ Building a gas transmission line through densely populated Westchester County outside of New York City brought up special public relations problems. Here is a report of how Tennessee Gas and Bechtel solved them to complete the job without mishap or complaint.
By Harrison T. Brundage.....Page 38

**Oil Pipe Lines Are Vital to Nation**

☐ This transportation system has shown a continuous growth to outgain all other intercity traffic. They now represent a $2.5 billion investment that, important in peacetime commerce, is absolutely essential for defense.
By Gordon C. Locke.....Page 41

**A 3000-Mile Long Photograph for Pacific Northwest**

☐ A photograph 3000 miles long was shot to cover the route of the Pacific Northwest pipe line system. The job was so good that only 10 percent of the original right-of-way selected had to be rerouted.
By Anthony Gibbon.....Page 42

**How to Batch Gasoline Through Crude Lines**

☐ To get the most profit from a crude oil pipe line, it often is advantageous to haul natural gasoline. But this brings up such problems as off-color, high gum content and seal difficulties. Here is the way one company solved these problems.
By C. N. Adams.....Page 46

**Are Your Memos Effective?**

☐ Here is a formula for writing better memos. Following these hints will help you set up an individual style for company communications.
By Auren Uris.....Page 50

**Control for Minimum Load Starting For Closed System Pumping Units**

☐ A special integration of electrically and pneumatic control can insure minimum load starting on electric centrifugal pumping unit. This is especially important on closed system pipe lines, and it has been applied successfully to pumping units ranging from 300 to 1250-horsepower.
By Max T. Nigh.....Page 58

**Regular Monthly Departments**

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PIPE LINE INDUSTRY published every month. Entered as second class mail matter July 9, 1954, at the post office at Houston, Texas, under the act of March 3, 1879.

# Whose Job Is It?

**Whose job is it** to see that the oil business has a better understanding at the hands of the public? Is it just the job of the American Petroleum Institute and its committees? Is it just the job of the company executive who may be a heavy stockholder—or who may not be but who has an interest in keeping a good job?

No, the responsibility goes far deeper than that. It goes to *every* individual who works in the oil business whether he works out in the oil fields, in a refinery, on a pipe line or works at a pump in a filling station.

If he intends to stay in the oil business then he had better do everything he can to help the oil industry get and maintain a good name at the hands of the public. His job is likely to be just about as stable as is the reputation of his industry.

How can you or anyone employed in the oil industry help it to secure and maintain a good name?

The answer to that is easy:

- So conduct yourself in all of your operations as an oil man in contact with the public so that the public will feel "that's a good oil company to do business with."

- If you hear somebody making a statement about the oil industry which your own information tells you is untrue, correct it in a friendly manner.

It is just as simple as that. If the several million employes of the oil industry in the U. S. will do just these two things, the results will be far greater than could be expected from a multi-million dollar advertising campaign.

And just as an editorial writer in one of our publications said last month, "this is not a job for just a week in the year —it is an every-day job, 365 (leap year 366) days in the year."

Ray L. Dudley

# Don't throw in the sponge!

● We're the first to admit that it is no easy job to specify and buy the thousands of products needed to maintain operations for a modern pipe line system. But before you throw in the sponge and retire to that South Sea island, call "Oilwell."

We've been living with procurement problems such as yours for 92 years. Skilled specialists are available who spend all their time working with men like you. Completely stocked warehouses are strategically located so that you can get the item you want direct from our stocks—in a hurry.

Why not call "Oilwell" the next time you have a problem?

**Complete warehouse system**—Well-stocked warehouses are conveniently located to serve the important pipe line centers. Inquiries are given prompt attention and deliveries are made quickly to meet your emergency requirements.

**Lower inventory investments**—You can cut your own warehouse stocks to a minimum, reduce obsolescence and get a wider selection of materials, sizes and brand names from "Oilwell's" complete inventories.

**Experienced personnel**—"Oilwell" pipe line specialists have been trained to understand your material and service problems and can give you the service you require.

**Quality products**—"Oilwell" stocks include the best known brand names in equipment and materials, designed and approved for pipe line operations. When it comes from "Oilwell," you know it will meet your specifications.

**92 years of experience**—From almost the beginning of the petroleum industry, "Oilwell" has worked with the men engaged in drilling and production. Our goal is to extend the same prompt, dependable and complete service to those responsible for Pipe Line operations.

## These famous products are sold by "Oilwell"

| | |
|---|---|
| Bridgeport Brass | Taylor-Forge |
| Catawissa | Thermoid |
| Johns-Manville | Vogt |
| Lunkenheimer | Walworth |
| Manning, Maxwell & Moore | Watson-Stillman |
| National Tube | Wilson-Snyder |
| | Worcester |

and many others

**OIL WELL SUPPLY**
DIVISION
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Casper, Wyoming
Charleston, W. Virginia
Garland, Texas
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USS

*Branches Serving All Oil Fields*

# "OILWELL"

TRADE MARK

UNITED STATES STEEL

D. H. LEWIS

# D. H. Lewis Named Chairman Of PIPE LINE INDUSTRY Editorial Committee

With this issue, D. H. Lewis, former vice-president of Shell Pipe Line Corporation, becomes the chairman of the Editorial Committee of PIPE LINE INDUSTRY, a newly created position.

Lewis will help to guide and formulate the editorial policies of the magazine to best serve the needs of construction, operating, and management men throughout the industry. His extensive background in the pipe line business makes him especially well qualified for such responsibility.

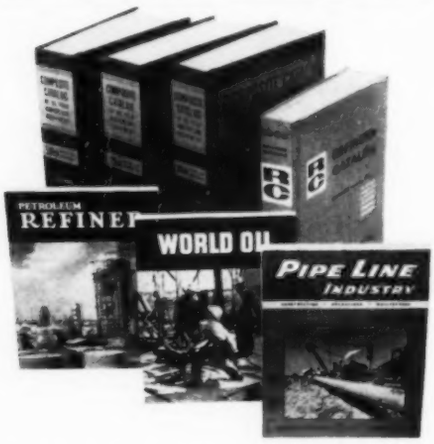
Lewis, who recently retired from Shell, had advanced from field supervisory assignments as a mechanical engineer to vice-president in charge of engineering. Before joining that company in 1928, he pioneered in the development and application of centrifugal pumps for crude oil pipe lines while with Allis-Chalmers Manufacturing Company following World War I.

As vice-president and formerly as chief engineer of Shell, he played an important part in the engineering, design, and construction of several large crude and products carriers in the U. S. and abroad. His leadership was especially valuable in Shell's recent heavy schedule of pipe line activities in South America.

Lewis has been an active member of many API committees and other industry groups devoted to pipe line advancements. In addition to his work as chairman of the PLI Editorial Committee, he will also act as a private consultant in pipe line engineering.

We are proud to have Don Lewis with us. His knowledge and keen insight into the problems of the industry will help PIPE LINE INDUSTRY serve you better.


## PIPE LINE INDUSTRY

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**PIPE LINE INDUSTRY** for the oil and gas pipe line industry.

**WORLD OIL** and **THE COMPOSITE CATALOG** for the drilling-producing-pipe line industry.

**PETROLEUM REFINER** and **THE REFINERY CATALOG** for the refining-natural gasoline-petrochemical industry.

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Advertising rates on application.

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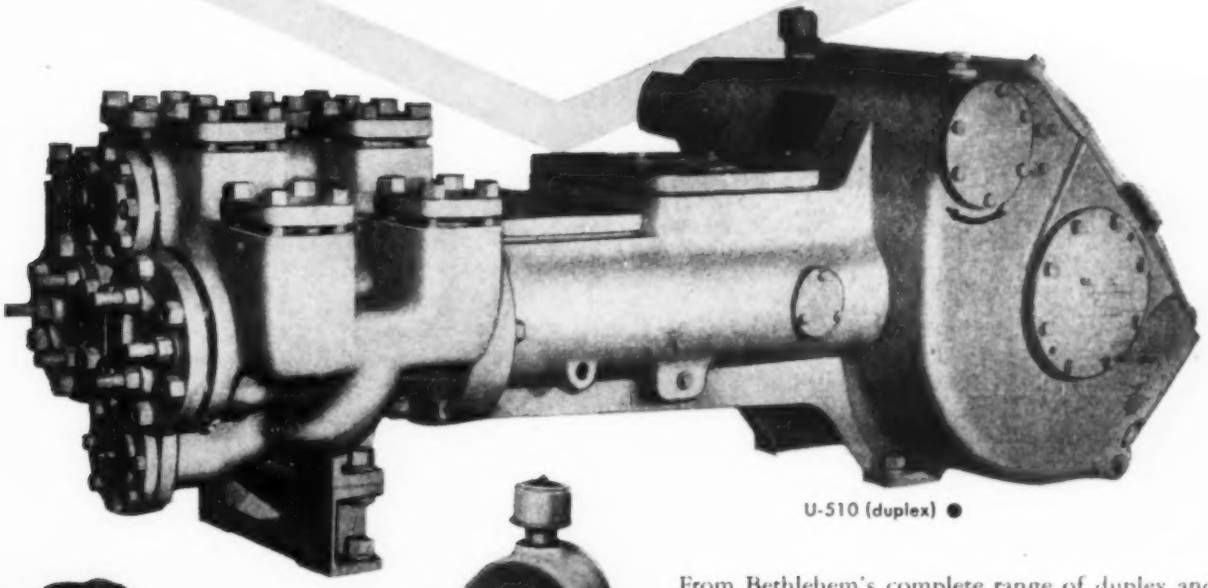
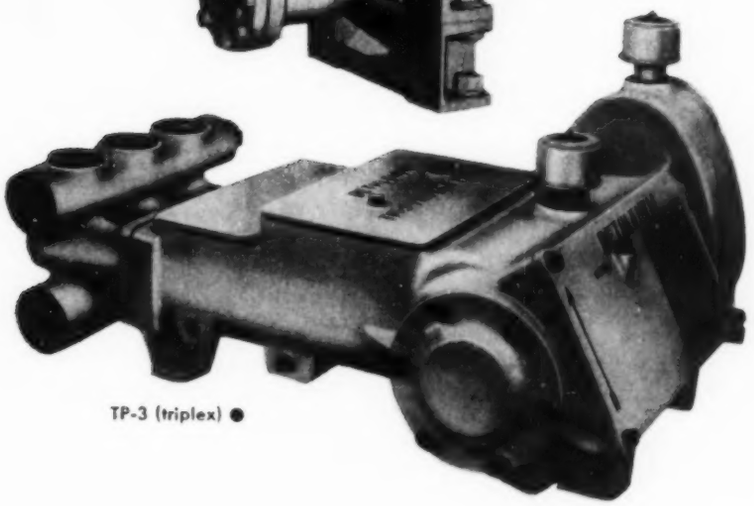
# A line of pumps with *everything* for Gathering, Pipe-Line Work, and Secondary Recovery



U-510 (duplex) ●



TP-3 (triplex) ●

| MODEL | TYPE | INPUT HP | BORE & STROKE |
|---|---|---|---|
| U-33 | Duplex | 8 | 1¾ to 3 x 3 |
| TP-3 | Triplex | 18 | 1¾ to 2¼ x 3 |
| U-46 | Duplex | 24 | 2½ to 4 x 6 |
| U-510 | Duplex | 100 | 3 to 5½ x 10 |

From Bethlehem's complete range of duplex and triplex power pumps, it is easy to select the proper unit for transfer, gathering, or pipe-line service. You'll find a pump that exactly meets your needs . . . whether it's something small, or a high-capacity unit to move big volume.

These are new, *modern* pumps, with up-to-the-minute features. Here are a few of the points that indicate their sound engineering:

High-strength alloy-iron power ends built to withstand full-load rating in 'round-the-clock service ★ Positive oil-bath lubrication of power end over the full speed range ★ Choice of alloy-iron, steel, or aluminum-bronze fluid ends with proper trim for each selection ★ Adaptability of entire line to speed-changer drive applications.

Complete pumps and stocks of parts, together with top-flight service, are available at Bethlehem Supply stores throughout the oil fields. You can obtain full information at the store point nearest you, or at any Bethlehem Supply sales office. Why not come in and see what we have to offer?

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General Offices: 21 E. Second St., Tulsa, Okla.
West Coast Headquarters: Los Angeles, Calif.
Export Distributor: Bethlehem Steel Export Corporation
25 Broadway, New York, N. Y.

**BETHLEHEM SUPPLY**

# WHAT'S COOKING?

A "batch" of the finest steel you could possibly want—that's what's cooking.

Of course, we have many and many a "recipe" for fine steels and in this particular case it's steel for the production of YOUNGSTOWN ELECTRIC WELD LINE PIPE.

Yes, we at YOUNGSTOWN spend many hours over a "hot oven" cooking up things (mainly fine steels of course) for industry. However, unlike the cooking that Grandma used to do—with a "pinch of this" and perhaps a "dab of that"—our cooking is done strictly by the book . . . there is no guess-work about steel making at YOUNGSTOWN.

Continuous day-by-day research and development makes possible a more efficient and economical operation and naturally a finer product.

So, today, when you order Youngstown Electric Weld Line Pipe, you can be assured that you are buying more than "just pipe"—you are buying years of experience in the making of steel of the highest quality—you are buying a longer lasting, more economical product—you are buying more years of trouble-free service—you are buying YOUNGSTOWN QUALITY AND SERVICE.

QUALITY YOUNGSTOWN SERVICE

**Youngstown**

**ELECTRIC WELD LINE PIPE**

**THE YOUNGSTOWN SHEET AND TUBE COMPANY** *Manufacturers of Carbon, Alloy and Yoloy Steel*

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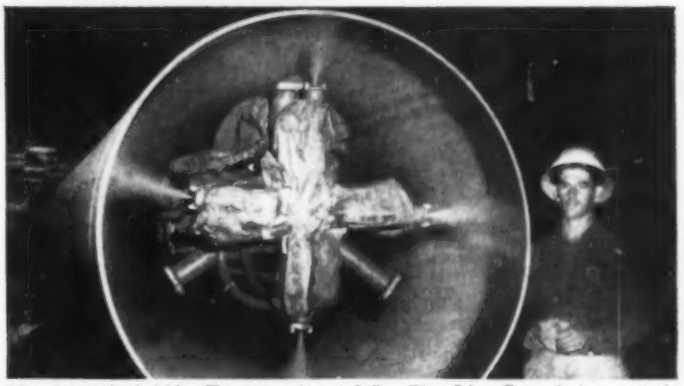
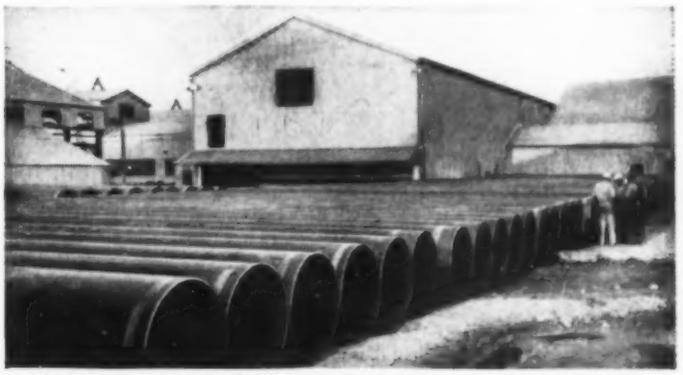
# EPON® RESIN does it!

## New Internal Coating *protects pipelines against corrosion by crude oil, salt water, gas*



**36" pipe** to be laid by Transcontinental Gas Pipe Line Corp. being coated with *Copon*, containing Epon resin. *Copon* is manufactured by Coast Paint and Lacquer Co., Houston.



**Stock of 36" pipe,** lined with Epon resin coating, to be used by Transco.

## HERE'S HOW...

INTERNAL CORROSION of gas pipe lines has long been a costly maintenance problem. The solution is an Epon resin coating that stands up to corrosives, that does not flake or peel off, that can be readily applied.

Such an Epon resin-based enamel is now going to work in nearly 300 miles of line for Transcontinental Gas Pipe Line Corp.

It's a *one-coat*, amine-catalyzed system which, cured at atmospheric temperatures, gives the performance of many baked finishes never before obtained with any other cold-cure coating. The Epon resin liner has complete adhesion to metals and extreme resistance to corrosion that keeps gas free of rust and pipe scale.

If you need a paint that lasts longer, that has excellent adhesion, resistance to abrasion and impact, ability to withstand a wide range of temperatures, humidity and corrosive atmospheres . . . ask for *Epon resin coatings*. Call on our sales offices for names of suppliers. Write for the full Epon coatings story in the brochure, "Planning to Paint a Pyramid?"

*Epon resins are the epoxy polymers made exclusively by Shell Chemical Corporation.*

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# WHEN TO DEMAND THIS DYNAMIC SEAL

There's a time to *insist* on Flexitallic Gaskets and *this* is it:

(1) When fluids are confined in critical pressure/temperature ranges

(2) When flanged joints are subject to thermal and physical shock, corrosion, vibration, weaving and unpredictable stresses

Since 1912, Flexitallic has made only one product — a Spiral-Wound Gasket, built on the original Flexitallic principle. It's a uniquely resilient construction that compresses under the applied load, adjusts itself to changes in operating conditions without affecting gasket efficiency and then rebounds when bolting is relaxed.

That is why more and more engineers are marking their purchase orders: "Flexitallic — do not substitute."

Each Flexitallic Gasket is designed and engineered to meet specific conditions. Spirally-wound V-crimped plies of required metal with alternating plies of proper filler result in a resilient gasket having characteristics of a calibrated spring.

Flexitallic Gaskets are at highest efficiency when bolted up cold at a predetermined load. For all pressure/temperature ranges from vacuum to 10,000 lbs., from extreme sub-zero to 2000°F. For all standard joint assemblies. In four thicknesses for special requirements: .125", .175", .250", .285".

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8th & Bailey Sts., Camden 1, N. J.
*Representatives in principal cities*

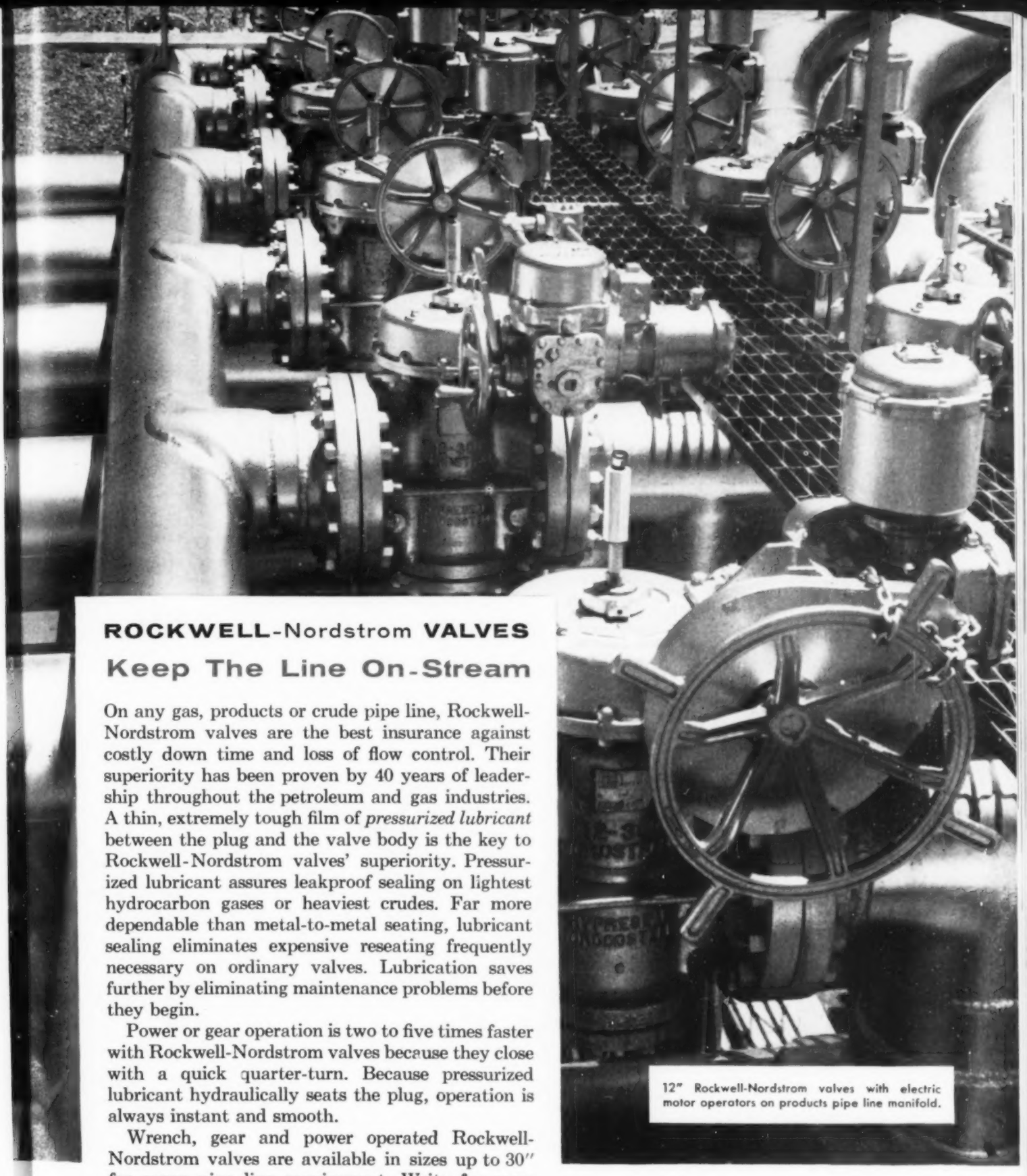
Flexitallic®
**SPIRAL-WOUND GASKETS**

FOR PIPE FLANGES, PRESSURE VESSELS AND PROCESS EQUIPMENT

**TEFLON FOR PROCESS APPLICATIONS**

The ideal seal for many process applications is a Flexitallic Gasket with Teflon trapped between edges of stainless steel. Ask for folder, "Teflon in Flexitallic Gaskets."

*Flexitallic is a registered trade name. No one else can make a Flexitallic Gasket. Look for *Flexitallic Blue*—it's our exclusive blue-dyed Canadian asbestos filler.



## ROCKWELL-Nordstrom VALVES

## Keep The Line On-Stream

On any gas, products or crude pipe line, Rockwell-Nordstrom valves are the best insurance against costly down time and loss of flow control. Their superiority has been proven by 40 years of leadership throughout the petroleum and gas industries. A thin, extremely tough film of *pressurized lubricant* between the plug and the valve body is the key to Rockwell-Nordstrom valves' superiority. Pressurized lubricant assures leakproof sealing on lightest hydrocarbon gases or heaviest crudes. Far more dependable than metal-to-metal seating, lubricant sealing eliminates expensive reseating frequently necessary on ordinary valves. Lubrication saves further by eliminating maintenance problems before they begin.

Power or gear operation is two to five times faster with Rockwell-Nordstrom valves because they close with a quick quarter-turn. Because pressurized lubricant hydraulically seats the plug, operation is always instant and smooth.

Wrench, gear and power operated Rockwell-Nordstrom valves are available in sizes up to 30" for every pipe line requirement. Write for more information: Rockwell Manufacturing Company, Pittsburgh 8, Pa.

*Canadian Valve Licensee:* Peacock Brothers Limited

12" Rockwell-Nordstrom valves with electric motor operators on products pipe line manifold.

40th YEAR

*of lubricated plug valve leadership*

# ROCKWELL-Nordstrom VALVES

**Lubricant Sealed For Positive Shut-off**

# . . . from contract to completion

## *You'll be Ahead with* ZACHRY

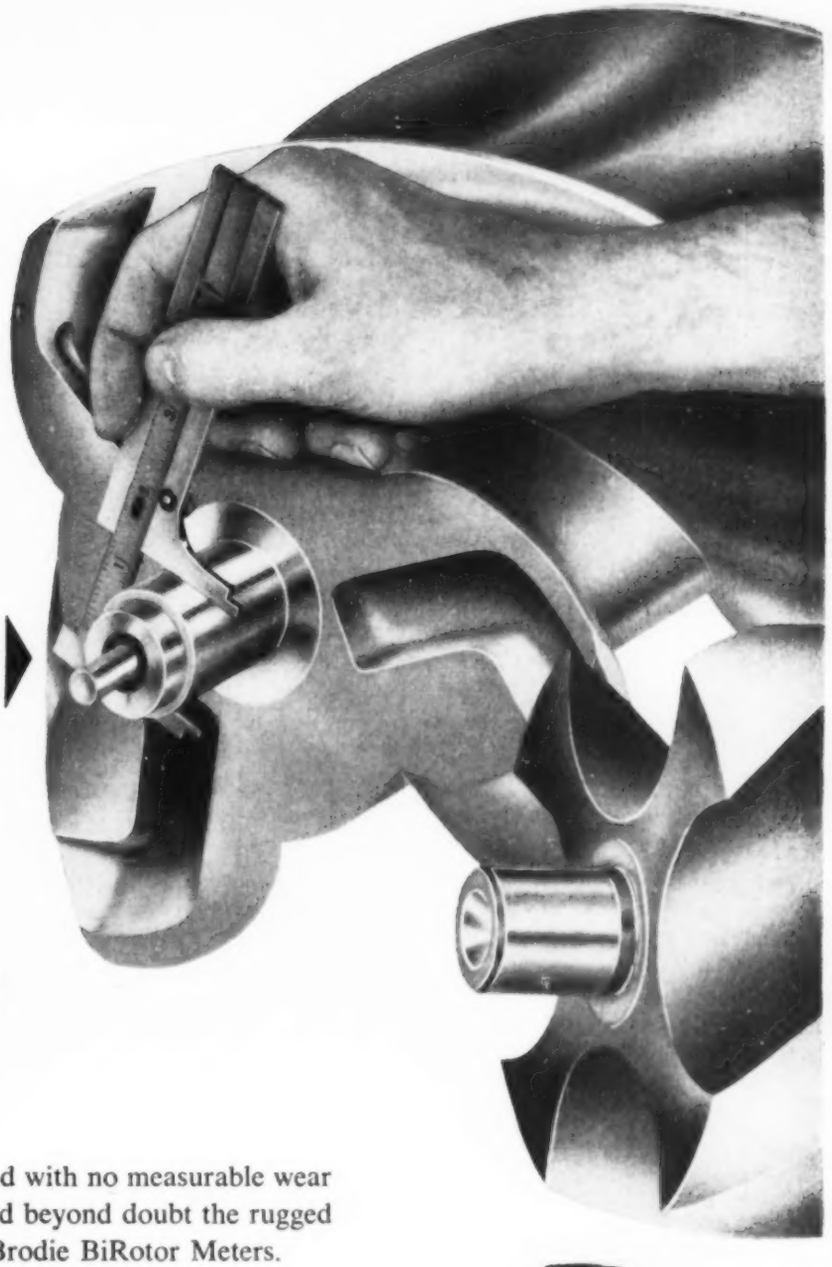
Modern equipment, manned by well-trained, experienced, year 'round crews, means that H. B. Zachry Co. will complete your pipeline contract to your satisfaction in regards to price, quality and time — giving you a giant-step to earlier, efficient operation.

**H.B. ZACHRY CO.**

**GENERAL CONTRACTORS**

TRANSIT TOWER
SAN ANTONIO
*PIPELINE DIVISION*

# LARGE ROTOR BEARINGS



## —the "hub" of proved performance in BRODIE BiRotor METERS

Hundreds of millions of gallons metered with no measurable wear —no replacement or repair—has proved beyond doubt the rugged endurance of large rotor bearings in Brodie BiRotor Meters.

Polished rotor bearing surfaces actually improve with use.

Coupled with the BiRotor's exclusive precision balanced performance and double case construction, heavy duty rotor bearings further account for Brodie's outstanding record of high sustained accuracy, smooth vibrationless operation, low maintenance and long service life. For years of fully dependable metering, investigate Brodie BiRotor Meters today

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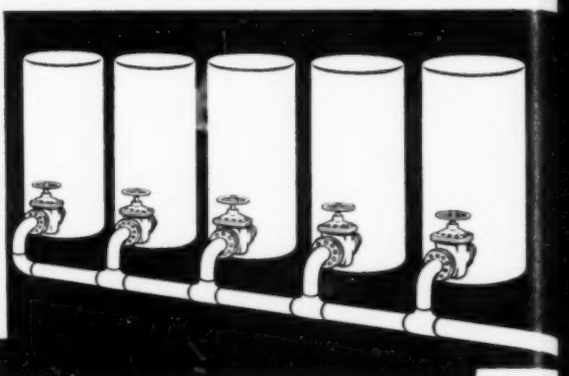
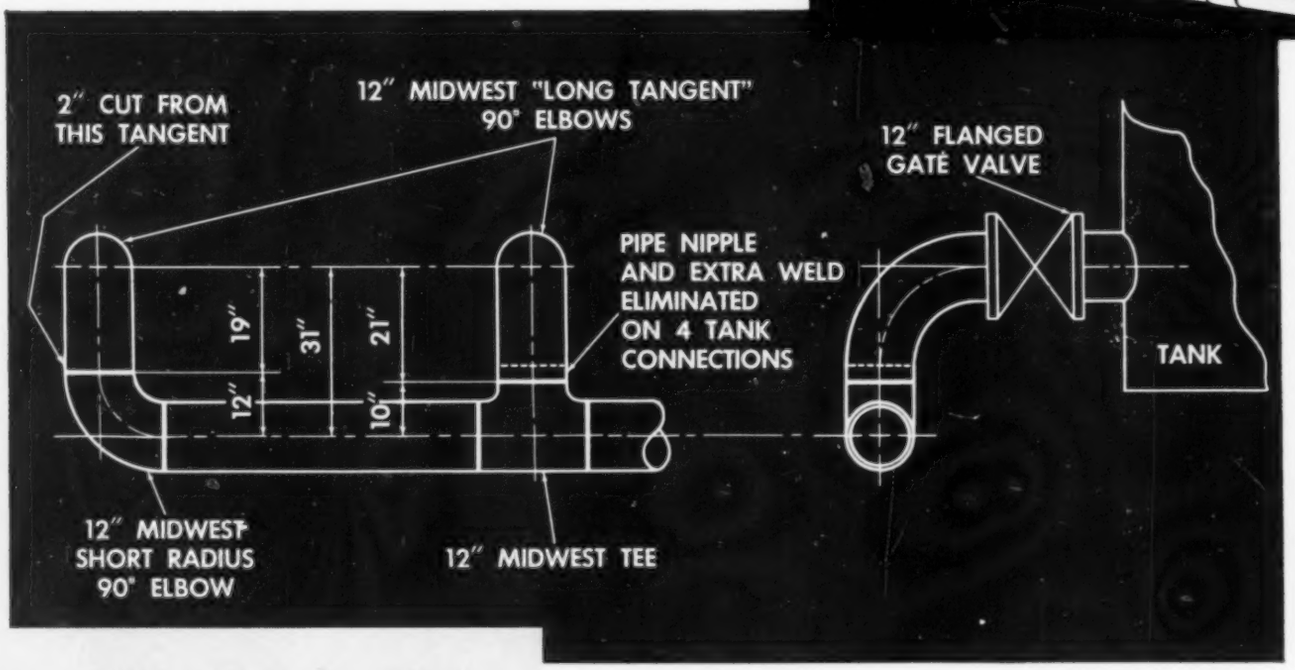
REPRESENTATIVES WITH STOCKS AND SERVICE FACILITIES IN ALL PRINCIPAL CITIES

# MIDWEST "LONG TANGENT" ELBOWS

## SAVED $156.20

## On This Welding Piping






**MIDWEST "LONG TANGENT" ELBOWS COST NO MORE THAN OTHER ELBOWS**

**The Problem:**

To connect the five tanks shown in the sketch at top to a common 12" header.

**The Difficulty:**

The center-to-outlet dimension of the 4—12" tees is only 10", while the shortest elbow available measures 12" center-to-end. Thus, if standard long radius elbows are used next to the five tank valves, four short nipples and four extra 12" welds would be required.

**The Solution:**

By using Midwest "Long Tangent" elbows as shown in the blueprint, the expense of the four extra nipples and welds was eliminated at the cost of just one cut! The actual net savings made by "Long Tangent" elbows on this job was $156.20.

Remember—Midwest "Long Tangent" elbows cost no more than regular elbows! For further information, write for Catalog 54.

**MIDWEST PIPING COMPANY, INC.**

**Main Office, 1450 South Second St., St. Louis 4, Missouri**

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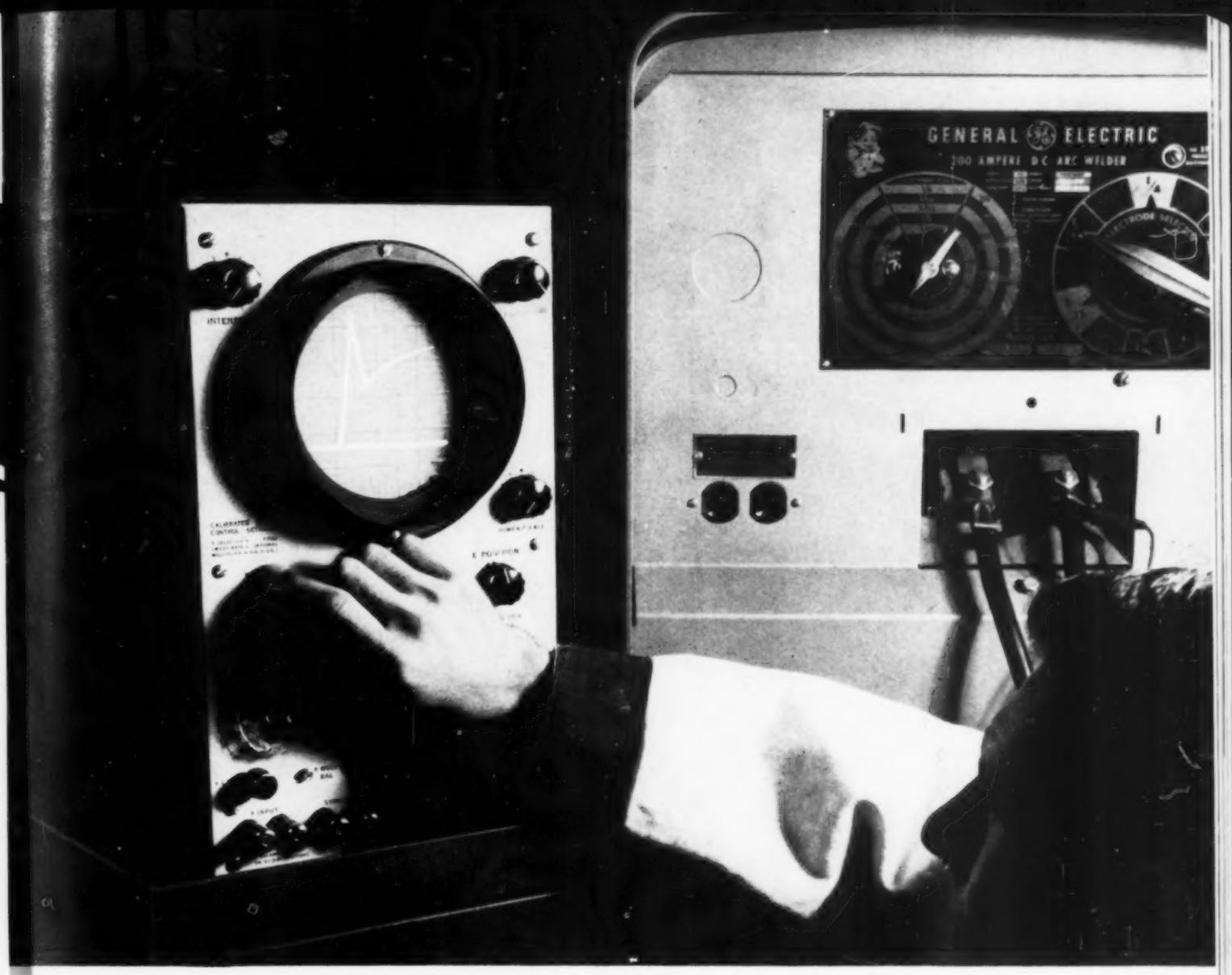
MIDWEST WELDING FITTINGS IMPROVE PIPING DESIGN AND REDUCE COSTS



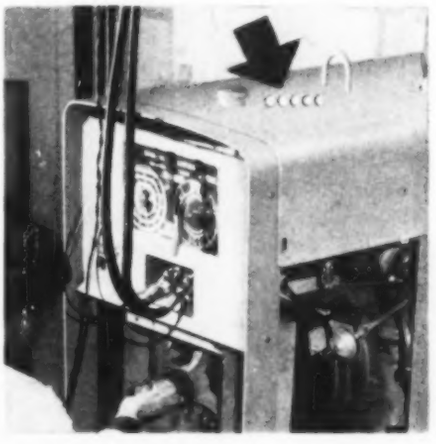

## *G.E.'S NEW ENGINE-DRIVE WELDER GIVES YOU . . .*

# Steady Welding Output—at Full Load; Improves Weld Quality, Costs Less Too

If you're using more than a 200-amp engine-drive welder for light to medium-heavy construction, you may be losing money. You may be paying for inefficiency—compensating for excessive loss of amperage and arc heat when operating at full load for sustained periods.

*Now*, with G.E.'s new 200-amp engine-drive welder, it's not necessary to buy more expensive, higher rated machines for pipeline, light construction, or job-shop work. This field-tested welder gives you steady output and 100% arc stability, hour-after-hour, even when operated ***above*** full load.

Test this powerful new welder yourself, and see the many advanced design features—new slow-down control, extra-rugged construction, and many others. Contact your nearby G-E Welding Distributor today. He's listed in the yellow pages of your phone book. Section 714-3, General Electric Co., Schenectady 5, New York.



**EXTRA-STURDY** construction is shown in this demonstration. Five nickels stand on edge while welder is operated at full load.

**GENERAL ELECTRIC**

# Johns-Manville TRANSHIELD® ASBESTOS PIPE LINE FELT

## *goes on fast, restricts soil stress, cuts maintenance*

Transhield Asbestos Pipe Line Felt meets the need for a felt that is economical yet effective in all ordinary soil conditions.

Designed for easy, high-speed application by modern machine methods, Transhield is strong, light in weight, and highly tear-resistant. Longer length rolls increase application speeds since fewer stops to replace rolls are required. Transhield's highly desirable characteristics are attained through an innovation in felt construction. It consists of a lightweight coal-tar saturated asbestos felt, reinforced with continuous glass yarns parallel-spaced on ¼" centers.

Because Transhield is a continuous membrane between the pipe line enamel and the soil, it works effectively toward preserving a continuous protective film of enamel on the pipe. It guards the enamel during construction and, after installation, it reduces the cold flow of the enamel, acting as a surface barrier to restrict soil stress.

• •

For further information about Transhield, write to Johns-Manville, Box 60, New York 16, New York; in Canada, 565 Lakeshore Road East, Port Credit, Ontario.

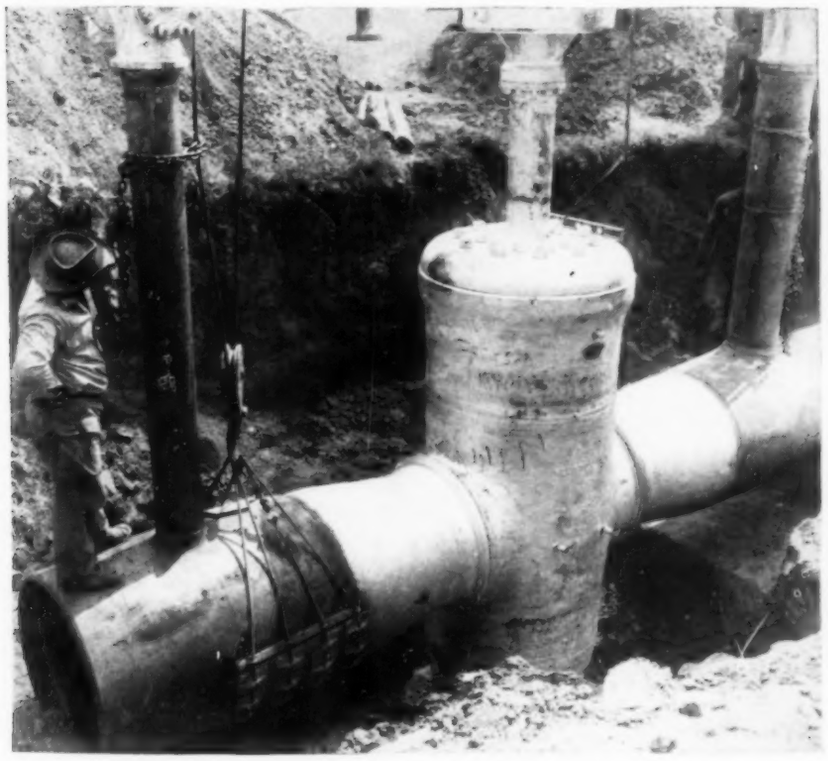
JOHNS-MANVILLE JM PRODUCTS **Johns-Manville PRODUCTS FOR PIPE LINE PROTECTION**

# COST REDUCERS DO BIG JOB

## on Transcontinental line

TUBE-TURN* Venturi Reducers minimize cost of valves and scraper traps on 36" line of Transcontinental Gas Pipe Line Corporation. Here's action at Station 15 near Mooresville, North Carolina. Contractor on this section: Panama Williams Corporation.

Two 30" x 24" TUBE-TURN Venturi Reducers welded to 24" valve.



Two TUBE-TURN Venturi Reducers, 36" x 30", welded to 30" valve.

Welding 32" x 30" TUBE-TURN Venturi Reducer to scraper trap for pipe line cleaner.

*"TUBE-TURN" and "tt" Reg. U.S. Pat. Off.

TUBE-TURN

**TUBE TURNS** LOUISVILLE 1, KENTUCKY

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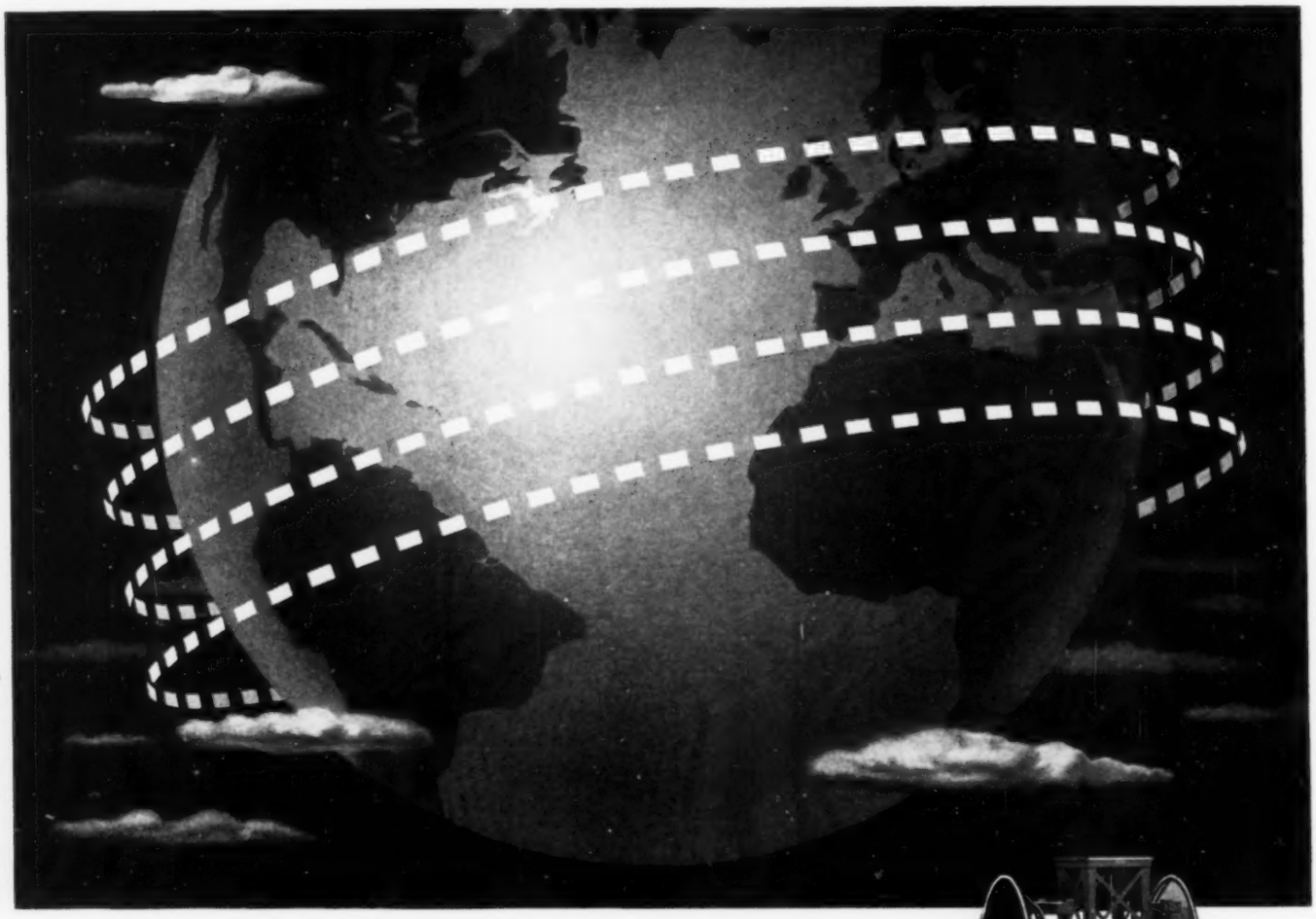
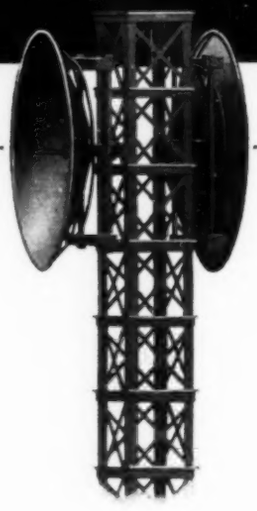
## FEDERAL MICROWAVE—"CERTIFIED BY A WORLD OF RESEARCH"





## 100,000 channel-miles is a lot of microwave experience

In 17 countries today... from Canada to Africa... from Sweden to Australia... multichannel microwave systems designed, manufactured, and installed by companies of International Telephone and Telegraph Corporation are serving government and industry... providing reliable communication over great distances... under all conceivable conditions of weather and terrain.

Consisting of links and networks, these vast and, for the most part, invisible communication facilities represent over 100,000 channel-miles, or more than four times the earth's equatorial circumference.

In this country alone, *Federal* Microwave provides tens of thousands of channel-miles... operated by pipelines, power utilities, telephone companies, municipalities, administrations, TV stations and others.

Designing and building multichannel microwave systems to meet the specialized circuitry requirements of such a wide variety of operations calls for experience... for engineering and manufacturing skill that has its roots in the pioneering days of microwave... for know-how that's *"Certified by a World of Research!"*

**Federal**

A DIVISION OF IT&T

**Federal Telephone and Radio Company**

*A Division of* INTERNATIONAL TELEPHONE AND TELEGRAPH CORPORATION

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*In Canada:* Standard Telephones and Cables Mfg. Co. (Canada) Ltd., Montreal, P. Q.

*Export Distributors:* International Standard Electric Corp., 67 Broad St., New York

# How to filter refined products

## ...without so much as lifting a finger!

Jet Strainers offer three distinct advantages over all others:

(1) They strain all of the product . . . all the time, requiring minimum stand-by capacity. This means that it is never necessary to by-pass any of the dirty product. Thus, metal seals, bearings and other vulnerable pump parts cannot be damaged by solids entrained in the product. Metering equipment is likewise protected against damage.

(2) Jet Strainers filter the product to any desired degree. Stainless steel strainer baskets are available in mesh sizes up to 400. Filter-aids may be used to further improve the brightness of the product.

(3) Since Jet Strainers are self-cleaning, automatic controls may be applied to the strainers to make their operation fully automatic if desired. Even semi-automatic Jet Strainer operation reduces the process to push-button control and manual opening and closing of a few valves.

The whole story on Jet Strainers has been prepared in booklet form. A copy will be sent gladly on request.

**THORNHILL-CRAVER CO.**
P. O. BOX 1184 HOUSTON, TEXAS

# JET STRAINER

*Strains all the product ...all the time*

## WANTED! . . . An engineer who likes to write

**A position is open on the editorial staff of *PIPE LINE INDUSTRY* for a young engineer who has had a few years of experience in oil or gas pipe line work. It offers a promising future in an interesting occupation to an aggressive individual who thinks he might like to write about pipe line operations, and who is willing to work, learn and assume responsibilities. Headquarters are in Houston, although some travel is necessary.**

**Send full details on education, experience in pipe line engineering field, plus age, family, salary desired, and recent snapshot or photograph. All replies confidential.**

**Address replies to: Warren L. Baker, Editorial Director, PIPE LINE INDUSTRY, Box 2608, Houston 1, Texas.**

Announcing the improved
TYPE "Z" WmSEAL CASING BUSHING
STAINLESS STEEL CLAMPS ARE HAND TIGHTENED, NO TOOLS REQUIRED
NON-SKID TEETH ON EXTRA LONG SKIRT HOLD BUSHING FAST TO CASING
EXTRA THICK "SHOULDER" (TOUGH SYNTHETIC RUBBER) CANNOT CUT THROUGH EDGE OF CASING
SOLID RING OF TOUGH SYNTHETIC RUBBER — NO JOINT
TIGHTER SEAL WITH WIDE STAINLESS STEEL BANDS AND CLAMPS
"Z" BUSHINGS STAY PUT EVEN IF PIPE MOVES IN CASING
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## WHO'S MEETING WHERE

| | |
|---|---|
| **1956** | |
| **JAN.** | |
| 9–13 | Society of Automotive Engineers, Sheraton-Cadillac and Statler Hotels, Detroit. |
| 16–18 | Pipe Line Contractors Association, 8th Annual Convention, Boca Raton Hotel and Club, Boca Raton, Fla. |
| 19–20 | National Association of Corrosion Engineers, Houston Section, Corrosion Short Course for Pipeliners, University of Houston. |
| 30–Feb. 3 | American Institute of Electrical Engineers, Hotel Statler, New York. |
| **FEB.** | |
| 15–17 | National Association of Corrosion Engineers, Tulsa Section, Corrosion Short Course, Mayo Hotel, Tulsa. |
| 19–23 | American Institute of Mining and Metallurgical Engineers, Hotel Statler, New York. |
| 19–25 | National Engineers' Week. |
| **MAR.** | |
| 12–16 | National Association of Corrosion Engineers, Hotel Statler, New York. |
| 19–21 | Mid-West Gas Association, Hotel Fontenelle, Omaha, Nebr. |
| 22–23 | New England Gas Association, Annual Meeting, Hotel Statler, Boston. |
| **APRIL** | |
| 1–8 | National Oil and Uranium Exposition, 48th District Agricultural Association Building, Los Angeles. |
| 3–5 | Corrosion Control Short Course, The University of Oklahoma, Norman, Okla. |
| 17–19 | Southwestern Gas Measurement Short Course, University of Oklahoma, Norman. |
| 19–20 | Indiana Gas Association, French Lick Springs Hotel, French Lick, Ind. |
| 23–25 | Southern Gas Association, Annual Convention, Dallas. |
| 30–May 4 | API Safety & Fire Protection Midyear Meeting, Warwick Hotel, Philadelphia. |
| **MAY** | |
| 10–11 | AGA Gas Supply, Transmission and Storage Conference, Conrad Hilton Hotel, Chicago. |
| 13–16 | API Division of Transportation, Shamrock-Hilton, Houston. |
| 22–24 | Pennsylvania Gas Association, Pocono Manor Inn, Pocono Manor, Penn. |

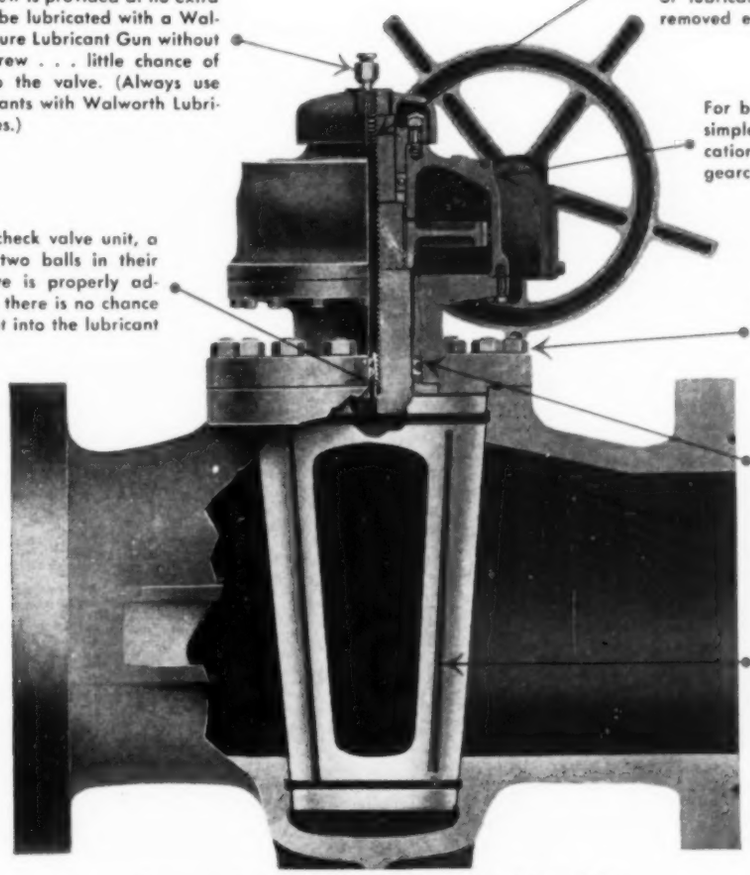
# Let's get technical about WALWORTH LUBRICATED PLUG VALVES for pipeline service

Combination button-head lubricant fitting and lubricant screw is provided at no extra cost. Valves can be lubricated with a Walworth High Pressure Lubricant Gun without removing the screw . . . little chance of grit getting into the valve. (Always use Walworth Lubricants with Walworth Lubricated Plug Valves.)

An added safety feature in the form of a groove cut part way up side of the lubricant-fitting screw allows the operator to observe any tendency of lubricant to blow out before the screw is removed entirely.

For buried pipelines — yoke design permits simple attachment of handwheel and lubrication extensions without modifying the gearcase.

In the stainless steel check valve unit, a transverse pin holds two balls in their seats. When the valve is properly adjusted and lubricated, there is no chance for line pressure to get into the lubricant system.



Cutaway of a 24-inch Walworth Lubricated Plug Valve

Standard bolt threads, rather than fine threads, mean easy replacement of nuts and bolts from local stocks.

Two overlapping Teflon packing rings form an effective seal against possible leakage without "grabbing" the plug shank. Low breakout torque . . . plug turns easier. Packing serves only as a seal and is not used to hold the plug in its seat.

Lubricant grooves completely frame the port openings and encircle the plug at the top and bottom assuring a tight seal against leaks. Bottom circumferential groove is separate from, but connected with, the lubricant well.

Other Walworth Lubricated Plug Valves include Single Gland and Regular Gland types. Sizes to 30 inches. Pressures to 5000 psi. and for vacuum service.

Without exception, a Walworth Ball Bearing Lubricated Plug Valve is easier to operate and maintain than any other type of rotary-action, sealed valve available today for pipeline service. Design features pointed out here show just a few advantages of Walworth Ball Bearing Lubricated Plug Valves.

Many pipeline companies throughout the world use Walworth valves for handling gas, crude, and finished products. Investigate the line of Walworth valves for your own needs. See your Walworth Distributor, or write for literature: Walworth Company, General Offices, 60 East 42nd Street, New York 17, N. Y.

**Use pigs or scrapers?**

Walworth Type 49 Cast Steel Gate Valves are designed on the throughport principle to permit passage of pigs and scrapers — may be installed without regard to flow direction. Sizes 2 to 30 inches inclusive. Ask for literature.

**WALWORTH**

*Manufacturers since 1842*

valves . . . pipe fittings . . . pipe wrenches

60 East 42nd Street, New York 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

## ANNUAL SURVEY SHOWS:

# U. S. Pipe Line Construction To Increase by 12 percent

**Building of more than 18,000 miles of new pipe lines in the U. S. during 1956 is forecast, nearly 2000 more than built in 1955. Big increase for natural gas construction is predicted, offsetting decrease in crude oil and product pipe lines.**

ANOTHER BIG YEAR in pipe line construction is likely during 1956. Nearly 2000 more miles of pipe lines may be laid in the U. S. during the coming year than in 1955, according to an annual survey of probable construction activity made by PIPE LINE INDUSTRY.

The survey, based on 1956 plans furnished by 160 companies, indicates that 17,150 miles of oil, gas and product lines, including both gathering and main line systems, will be constructed in the U. S. during the year. This would represent an increase of 12 percent over the estimated 1955 construction of 15,270 miles, and would be almost equal to the 17,745 miles constructed during 1954.

**Heavy gas line construction** will feature 1956 activities. All the increase in construction will be due to building an enlarged amount of natural gas pipe lines, a decrease being forecast in the construction of both crude oil and refined product lines. Consequently, natural gas will comprise the bulk of the new pipe line mileage built during 1956.

The forecast anticipates the construction of 13,200 miles of new natural gas lines in the U. S. during 1956. This represents more than three-fourths of all the pipe line construction anticipated in the nation. This figure is composed of 11,450 miles of transmission line and 1750 miles of gas gathering lines.

This forecast calls for much more gas line construction in 1956 than during 1955. The 13,200 miles forecast for the coming year compares with only 8700 miles laid during the past year, and the laying of 8980 miles of gas lines during 1954.

Whether this much gas line construction takes place or not depends primarily upon whether the Federal Power Commission approves several applications for large projects early enough in the year to permit extensive construction to be completed.

For example, Midwestern Gas Transmission Company, an affiliate of Tennessee Gas Transmission Company, has an application before FPC for construction of a 1100-mile line from Manitoba, Canada, to Nashville, Tenn. As a part of this same over-all plan, Tennessee Gas also has requested FPC permission to loop some of its main line. How much of this work is completed in 1956 depends on how quickly the FPC acts.

**Less crude oil lines** will be built in the U. S. during 1956, according to the survey. The construction of only 2750 miles of crude oil trunk and gathering lines is forecast for the coming year, contrasted with the building of 3910 miles during the past year.

Construction in 1956 is expected to consist of about 1400 miles of trunk line and 1350 miles of gathering lines. The past year saw the building of 1960 miles of trunk lines and 1950 miles of gathering lines.

No single major crude oil line is expected to be constructed in 1956. Even trunk line construction will consist mostly of short distance lines. Should any now unforeseen long distance crude line materialize during the year, the amount of crude lines built in 1956 would exceed the volume predicted in this forecast.

**Less product lines** also will be constructed during the coming year. While 2660 miles of refined product lines were built during 1955, only 1200 miles are anticipated for 1956.

However, it is probable that construction may exceed the total now anticipated. Additional systems may change quickly from the thinking and proposed stage to definite projects.

A significant development in the product pipe line picture was the entry of railroads into the field during 1955. This may have a major bearing on future operations. Southern Pacific Railroad currently is completing work on a 844-mile product line extending along its right-of-way between Los Angeles and El Paso. Several other railroads are reported to be studying the possibility of constructing product pipe lines along their railway right-of-way. Northern Pacific Railroad has an interest in the Butte crude oil pipe line from Williston Basin to Montana.

**This survey of construction** does not include lines smaller than 4-inch in diameter, distribution gas lines laid inside corporate city limits, nor lines that will be built outside of the U. S. There also will be heavy pipe line construction abroad, especially in Canada and Western Europe.

Figures are based on miles of new line that will be laid during the year, not miles of new systems that will be placed in operation during the year. Therefore, they include completed portions of systems that will still be

# Is Due In 1956

under construction at the end of 1956. On the other hand, only uncompleted parts of systems that were under construction at the beginning of the year are included in the 1956 forecast.

The 160 companies that participated in the survey represent the ownership of a vast majority of the U. S. pipe line mileage for oil, gas and products. Practically every large company in the nation responded to the questionnaire. They told PIPE LINE INDUSTRY how many miles of lines they built in 1955 and the number of miles they expected to construct during 1956, with the understanding that all individual company plans would be held in strict confidence. Data received from pipe line companies was then increased by a small amount to provide an allowance for construction likely to be done by concerns which did not participate in the survey.

**More construction abroad** is anticipated during 1956, especially in Canada. This activity is not included in the preceding figures covering only U. S. prospective construction.

Trans-Canada Pipe Lines, Ltd., is expected to start construction on a 2250-mile natural gas line from fields in Alberta Province to Toronto and Ottawa. It would be the longest pipe line in the world, and would provide an outlet for mounting shut-in reserves of natural gas in southern Alberta.

Westcoast Transmission Company plans a 650-mile 30-inch gas line from the Peace River fields of Canada into northwestern U. S., where it would connect with the Pacific Northwest system being built in the U. S.

A number of other Canadian projects are expected to be constructed, including about 500 miles of crude oil lines and an equal amount of gas lines.

Western Europe also will be active in pipe line construction, principally because of North Atlantic Treaty Organization product projects. Among the NATO projects scheduled for 1956 construction are four pipe lines in France totaling about 600 miles, and completion of a partially finished 485-mile line in Spain. Other smaller NATO projects will be built during the year. NATO also will continue work on a 450-mile products line from Iskenderun, Turkey, to Batman.

Among other construction outside of the U. S. will be a 573-mile products line extending from Abadan to Tehran, Iran. An 188-mile gas line from Sui gas field to Multan in Pakistan also is scheduled for 1956. A contract has been let for construction of a 210-mile crude oil from Sica Sica, Bolivia, to the port city of Arica.

A number of other pipe line projects are likely to be built outside of the U. S. during 1956.

Consequently, the outlook is for an active pipe line construction year, both in the U. S. and the other parts of the world.

—The End

## PIPE LINE CONSTRUCTION FORECAST FOR 1956

### ALL LINES

**Construction of 17,150 miles of oil, gas and product pipe lines in the United States is forecast for 1956. This compares with estimated 15,270 miles constructed during 1955. Construction during coming year expected to consist of approximately 3100 miles of gathering lines and 14,050 miles of trunk lines.**

### OIL LINES

**Building of 2750 miles of crude oil lines is forecast for 1956, including 1400 miles of trunk lines and 1350 miles of gathering lines. This will be a decrease from 3910 miles constructed during 1955.**

### GAS LINES

**Natural gas line construction is expected to account for the bulk of the U. S. building. Building of 13,200 miles of new natural gas system is predicted for 1956, compared with 8700 miles built during 1955. Transmission lines are expected to account for 11,450 miles of the 1956 total.**

### PRODUCT LINES

**Construction of 1200 miles of new product lines in the U. S. is anticipated during 1956, compared with the building of 2660 miles in 1955.**

# Contractors Meet at Boca

BLEDSOE

ALLEN

WILLIAMS

GUMP

Officers of the Pipe Line Contractors Association in addition to President-Director H. C. Price are C. C. Bledsoe, Midwestern Constructors, Inc., first vice president and director; Earl Allen, Associated Pipe Line Contractors, Inc., second vice president and director; John H. Williams, Williams Bros. Company, treasurer and director; and Richard A. Gump, executive secretary. Other

H. C. PRICE, president of the Pipe Line Contractors Association, has been engaged in the construction of large diameter pipe lines since 1928. As president of H. C. Price Co., Bartlesville, Okla., he has been a leader in the industry since advent of the welded pipe line. Drawing on a depth of experience, he will discuss the problems and future prospects in pipe line construction at the 1956 association business meeting.

SCENE OF THE eighth annual convention of the Pipe Line Contractors Association is far from the muskeg country of Alaska, the Rocky Mountain right-of-way, and the south Louisiana marshlands where construction news was made in 1955, but at the Boca Raton Club on the Florida coast over 700 industry leaders meet January 16-18 to take a quick look at what's ahead for the industry. Predictions appear good—pipe line construction surveys for 1956 forecast an expected increase of almost 12 percent over 1955.

This year's program emphasizes the growth the association has shown, both in membership and activities. Now that the early years of organization have been passed, it is actively pursuing the general purposes behind its formation:

- To make membership in the association a reasonable assurance to the public of the skill, integrity and responsibility of its members.

## Speakers . . .

GORDON DEAN, Lehman Bros., New York, director of several organizations active in atomic energy development and former chairman of the U. S. Atomic Energy Commission, gives a broad view of future energy needs and sources—"The Effect of Atomic Energy on the Petroleum Industry."

FRANK M. PORTER, president of the American Petroleum Institute, New York, credits the pipe line contractors' role in the development of the oil industry—"The Contribution of Pipe Line Construction to the Petroleum Industry."

W. C. McGEE, JR., a senior vice president of Tennessee Gas Transmission Company, Houston, Texas, points out the important regulatory problems facing the gas transmission industry—"Relationship Between Federal Power Commission and Pipe Line Companies."

# Raton, Florida

BURDEN

CONYES

GREGORY

MANUEL

directors now serving are: O. R. Burden, O. R. Burden Construction Corporation; R. A. Conyes, Conyes Construction Corporation; R. P. Gregory, Houston Contracting Company; G. A. Manuel, Williams-Austin Company; N. K. McFarland, Lone Star Constructors; James P. Neill, Western Constructors; S. L. Richards, Jr., Rosson-Richards Company, and Ray Leigh Smith, Ray L. Smith & Son, Inc.

McFARLAND

NEILL

RICHARDS

SMITH

• To maintain the standards of the pipe line contracting business at the level necessitated by its quasi-professional character and to establish members of the association in the public mind as contractors who fulfill obligations in good faith.

• To promote cordial and cooperative relations among pipe line contractors and between pipe line contractors and those with whom they deal or have contact.

• To encourage efficiency among pipe line contractors and their employes.

• To seek correction of injurious, discriminatory or unfair business methods practiced by or against pipe line contractors.

• To eliminate as far as possible the occurrence of injury and death to pipe line contracting employes.

With these general aims in mind, the association has gone about specific objectives to achieve better labor relations, greater safety for pipe line construction workers, and quickly accept its share of responsibility to work with other petroleum industry groups for the good of all. This work has earned the just respect of the industry.

The 1956 program focuses attention on the future of the pipe line contracting business. Here is the complete calendar of events:

## Program

### PIPE LINE CONTRACTORS ASSOCIATION, BOCA RATON HOTEL AND CLUB, BOCA RATON, FLORIDA

**SUNDAY, JANUARY 15, 1956**

6:00 p.m. Pre-convention party for contractors and their wives only—Cathedral Room

**MONDAY, JANUARY 16**

9:30 a.m. Bus tour for ladies attending convention, courtesy Allis-Chalmers Manufacturing Company. (Tour includes points of interest in Miami and Miami Beach, and luncheon at the Garden Restaurant).

10:00 a.m. General business session—Auditorium (open to all).

1. H. C. Price, president, presiding.
2. "Relationship Between Federal Power Commission and Pipe Line Companies"—W. C. McGee, Jr., senior vice-president, Tennessee Gas Transmission Company, Houston, Texas.
3. "The Contribution of Pipe Line Construction to the Petroleum Industry"—Frank M. Porter, president, American Petroleum Institute, New York, N. Y.
4. "The Effect of Atomic Energy on the Petroleum Industry" — Gordon Dean, Lehman Bros., New York, N. Y., (formerly chairman, Atomic Energy Commission).

12:00 noon Cocktails in Cloister Lounge and luncheon in Patio Royale for all men—courtesy M. J. Crose Manufacturing Co., Inc.

6:00 p.m. Cocktails and steak roast, Cabana Club—courtesy Caterpillar Tractor Company.

**TUESDAY, JANUARY 17**

10:00 a.m. Closed business session for regular members only—Auditorium

1. H. C. Price, president, presiding.
2. Presentation of awards for safety achievements.
3. "Recent Developments in Welding Research"—Paul Reed, Pipe Line Editor Oil and Gas Journal.

12:00 noon Luncheon and style show by Neiman-Marcus in Patio Royale—courtesy Crutcher-Rolfs-Cummings.

2:30 p.m. Closed business session for regular members only—Auditorium.

1. Reports of committees
2. Election of officers and directors

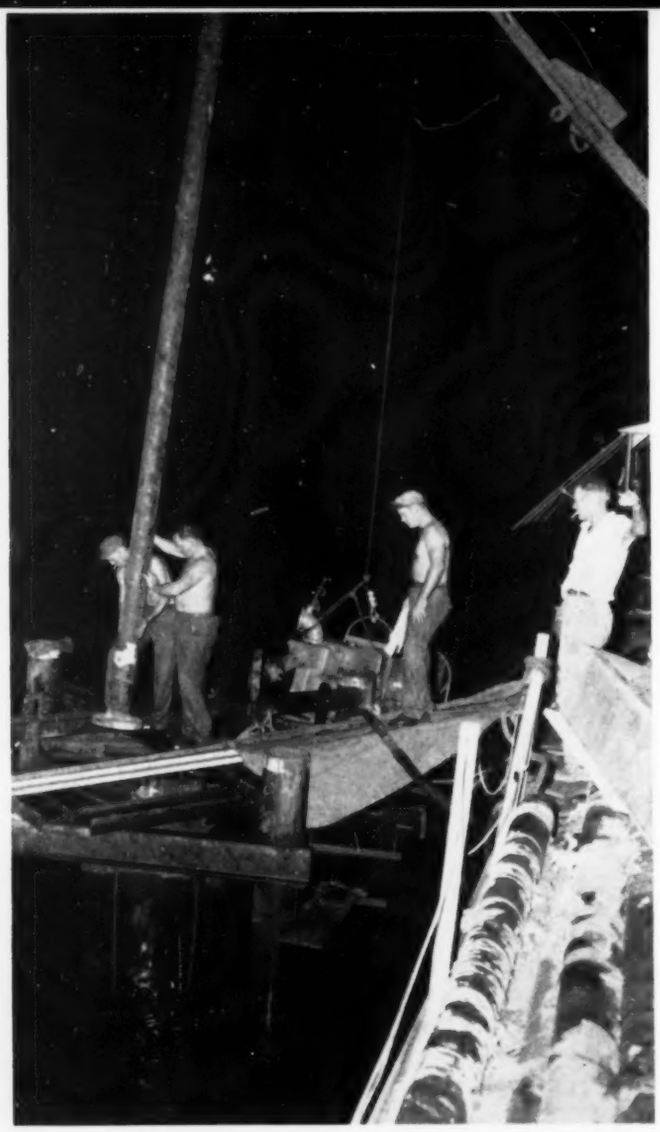
6:00 p.m. Cocktails in Cloister Lounge and Cloister Loggia—courtesy International Harvester Company.

7:30 p.m. Annual banquet and floor show—Patio Royale.

**WEDNESDAY, JANUARY 18**

8:00 a.m. Meeting of board of directors

10:00 a.m. Meeting for regular members only for discussion of labor matters.



Late at night—the first open sea hot tap nears completion in 22-foot deep Gulf waters.

# NEW IDEAS...

## 1. Offshore hot tap opens horizons to marine lines . . .

MAKING A HOT TAP on a 10¾-inch pipe line 22 feet under the waters of the Gulf of Mexico is not a pipe line contractor's idea of a picnic, but it was completed successfully in 1955.

To make it, Brown & Root, Inc., used a hinged bell that fitted around the pipe and closed much like a clam bucket on a dragline. The bell was 34 feet long and approximately 6 feet by 8 feet in cross section. Bracing inside the ⅜-inch thick steel shell provided sufficient strength to withstand water pressure and wave action. Seas were as high as two or three feet during preparation for the tap. A 10-inch opening located about four feet above the bottom formed a seal against the pipe by angle iron padded with foam rubber.

First, the pipe line was uncovered by a deep water jet suction barge. Four 12-inch pilings were then driven into the Gulf floor to hold the bell steady. A centrifugal pump maintained the water level at a point where welders could work safely.

Once the bell was in place and pumped out, the tap was made in a conventional manner, the bell was unclamped and raised by a derrick barge and the tie in was completed. Using this method, new offshore wells can be tied in to existing lines as future production is developed.

(See PIPE LINE INDUSTRY, October, 1955, page 70 and November, 1955, page 40.)

First step in making the tap was to lower the bell over the pipe. Piling driven around the bell later held it steady against waves and sea.

# MADE PIPE LINE PROGRESS IN 1955

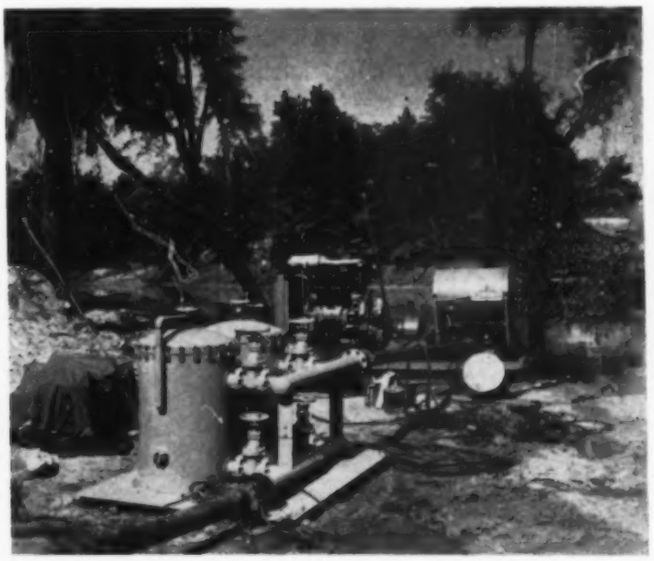
By **MELVIN A. JUDAH**
PIPE LINE INDUSTRY Staff

FEW INDUSTRIES produce the variety of new ideas to solve field problems as do pipe line construction spreads. Together these solutions add up to the progress the industry makes year after year.

During 1955, 36-inch pipe was laid on several large looping projects using conventional methods with outstanding success. Many new ideas were born of underwater pipelining in the marshlands of southern Louisiana and submarine jobs offshore. New problems arose rapidly —many were solved just about as quickly.

PIPE LINE INDUSTRY presents here some of the highlights that brought advancements in 1955.

Effectiveness of filter elements demonstrated; 120 filters were used per unit to handle 2500 gallons per minute.



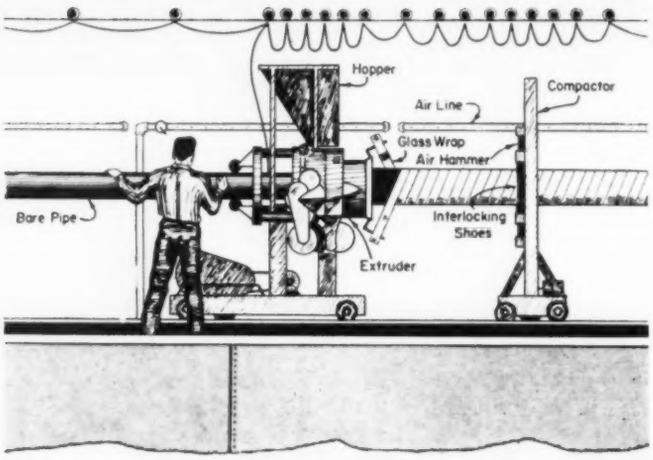
Dual filter unit and filling pump on the Tombigbee river in Alabama.

## 2. Water filters pay off on hydrostatic testing . . .

DURING its 1955 super-inch construction project, Transcontinental Gas Pipe Line Corporation made every effort to keep the inside of the new line as clean and dry as possible after testing. Internal surfaces were coated with slick, tough epoxy resin coating to prevent water from entering into pores and mill scale of the pipe during hydrostatic tests.

To keep lines clean during hydrostatic tests, Transco filtered the water used. Practically all sand and much of the silt was removed before the water was put into the line. Transco thus eliminated the need for stiff wire brush pigs to dry the line. Soft bristle pigs were used and, in many cases, no scraper pigs were necessary.

Filter elements were the excelsoir and rag type commonly used on analine dye filtering. There were 120 elements per filter unit to handle 2500 gallons per minute. A twin unit was used to speed testing operations. Downstream samples of water showed little or no trace of sand below the filters. (See PIPE LINE INDUSTRY, October, 1955, page 46.)




**Artist's idea of new asphalt weight coating machine aboard pipe laying barge.**

## 3. Asphalt mastic coating promises double duty . . .

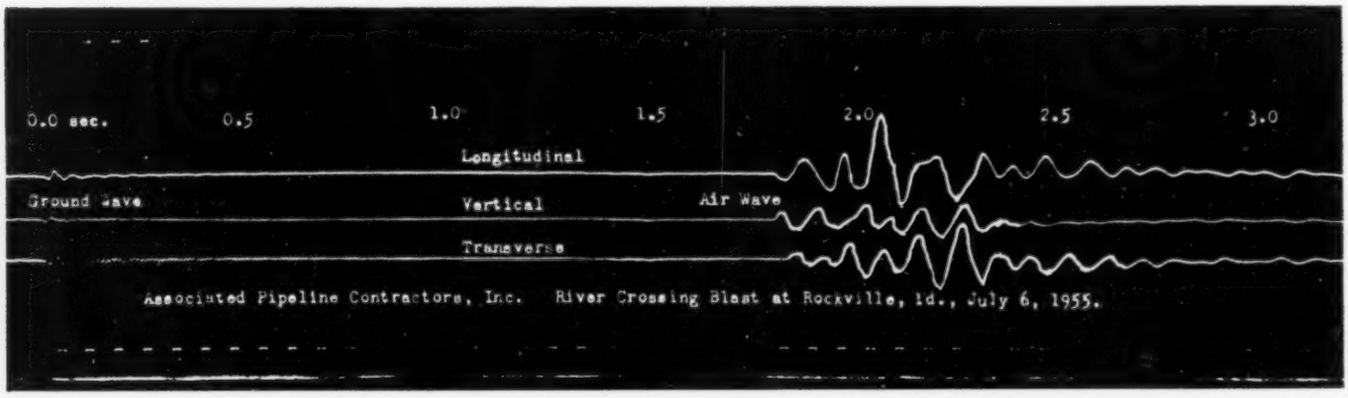
DEVELOPMENT of a new asphalt mastic material weighing up to 240 pounds per cubic foot and promising good corrosion protection stirs the imagination of engineers in offshore construction. Although still in the experimental stage it has appeared good enough in preliminary tests to warrant application trials.

This system is a dual-purpose coating consisting of a mixture of asphalt modified with rubber plus barite aggregates and internally reinforced with glass fiber material. It is compacted upon the pipe and reinforced externally with a glass mesh outer wrap for resistance to shock and abrasion.

Its developers report good bonding and physical properties. Pipe can be deformed up to its elastic limit without damaging the coating. If the coating proves feasible in further tests, minimum bending radius which could be allowed during construction would be limited only by possible damage to the pipe.

Application techniques are simple. The pipe is first cleaned and primed; next the coating is extruded onto the pipe at a temperature of approximately 300 degrees as the pipe moves through the machine. A double wrap of glass fiber goes around the pipe as it comes from the extruding section. A water spray cools the coating as it emerges and a compactor consisting of shoes mounted upon interlocking air hammers packs the coating around the pipe. A second water spray cools the final coating. When the coating reaches 80 degrees it can be handled in a conventional manner without damage.

(See PIPE LINE INDUSTRY, December, 1955, page 20.)




## 4. Seismograph records forestall blast law suits . . .

PROBLEMS THAT pipe line contractors have to face are continuously full of surprises. Associated Pipe Line Contractors, Inc., who had a section of Transco's 1955 expansion project near Washington, D. C., had to blast a ditch within ear shot of many expensive estates near the Potomac river.

Realizing that chances might be good for nearby home owners to lay blame for any suspected damage at their door, Associated made a seismograph record of the Potomac river crossing blast.

Extensive research by the U. S. Bureau of Mines, insurance companies and seismological engineers has produced criteria to define amounts and types of vibration required to damage structures. For instance, at 10 cycles per second a movement of 0.04 inch is required to produce damage. At 25 cycles the movement must be at least 0.02 inch.

Traces on the film record showed that the contractor allowed for a wide safety margin. Thus by using wise foresight, Associated and Transco gave their attorneys good evidence to protect the companies in case of lawsuits. (See PIPE LINE INDUSTRY, October, 1955, page 44.)

## 5. Pipe lines launched into Pacific surf in a bundle . . .

BUNDLE LAUNCHING of four pipe lines and a telephone cable from the California mainland to a drilling island off Seal Beach cut construction time and costs. Only one trench was needed; all lines were pulled in a single operation; and trenching time was reduced as the trench was narrower than would have been necessary if lines had been laid side by side.

An 8-inch "main" line transports crude and natural gas ashore from producing wells, and three 3-inch lines are used for fuel, water and drilling mud delivery plus special well test purposes. Pipe was assembled on the beach in 750-foot lengths and then welded and launched into the surf using the controlled buoyancy technique developed by Collins Construction Company.

The four pipe lines and telephone cable were strapped together at 10-foot intervals using high tensile steel 2-inch by 0.050-inch straps cinched tightly by a ratchet binder. Asphalt-impregnated pads were placed between bands and the mastic-coated pipe to prevent damage to the coating.

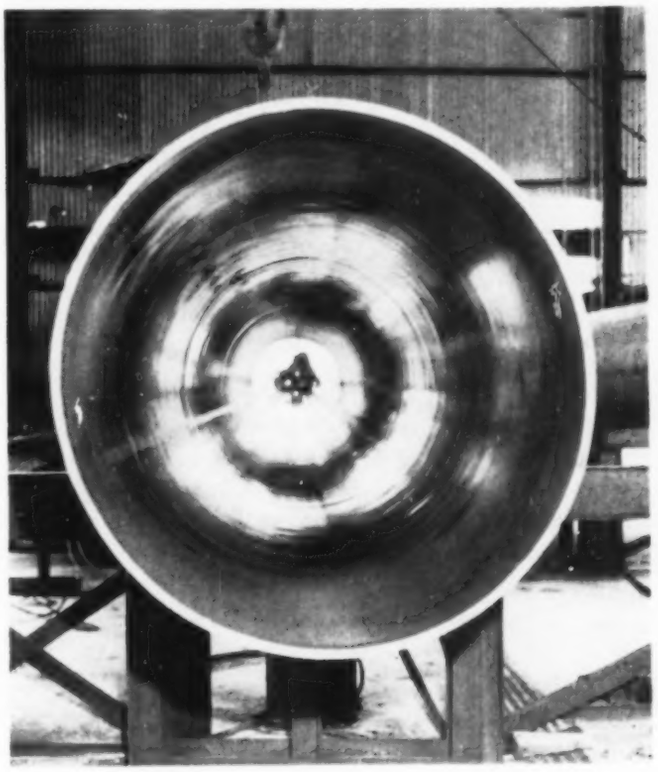
Launching of the bundle proceeded smoothly with the three 3-inch pipes riding directly on dollies. Pulling and trenching of the lines in a bundle produced no special difficulties for standard equipment already proved in other marine construction jobs. (See PIPE LINE INDUSTRY, June, 1955, page 55.)

## 6. Epoxy resin is promising as internal pipe coating . . .

IN ITS 1955 construction program, Transcontinental Gas Pipe Line Corporation coated more than 200 miles of 30 and 36-inch pipe internally with epoxy resin at the mill.

This plastic material is highly resistant to chemical attack and possesses good physical and bonding properties. Coating contractors for Transco, Rosson-Richards Company, set up a plant at the pipe mill. Pipe was chemically cleaned with a hot alkaline bath, an acid bath and phosphatizing solution. After pipe was dry, resin and curing agent were sprayed internally as the pipe was rotated. After seven days, the cured coating was so tough an ordinary pocket knife would not cut to the bare metal.

Although tests have not yet been completed, the new coating technique promises cheaper hydrostatic testing by reducing amount of pigging required to remove water; less internal corrosion during storage in corrosive atmosphere; and possibilities of an improved friction factor. (See PIPE LINE INDUSTRY, March, 1955, page 40 and May, 1955, page 64.)

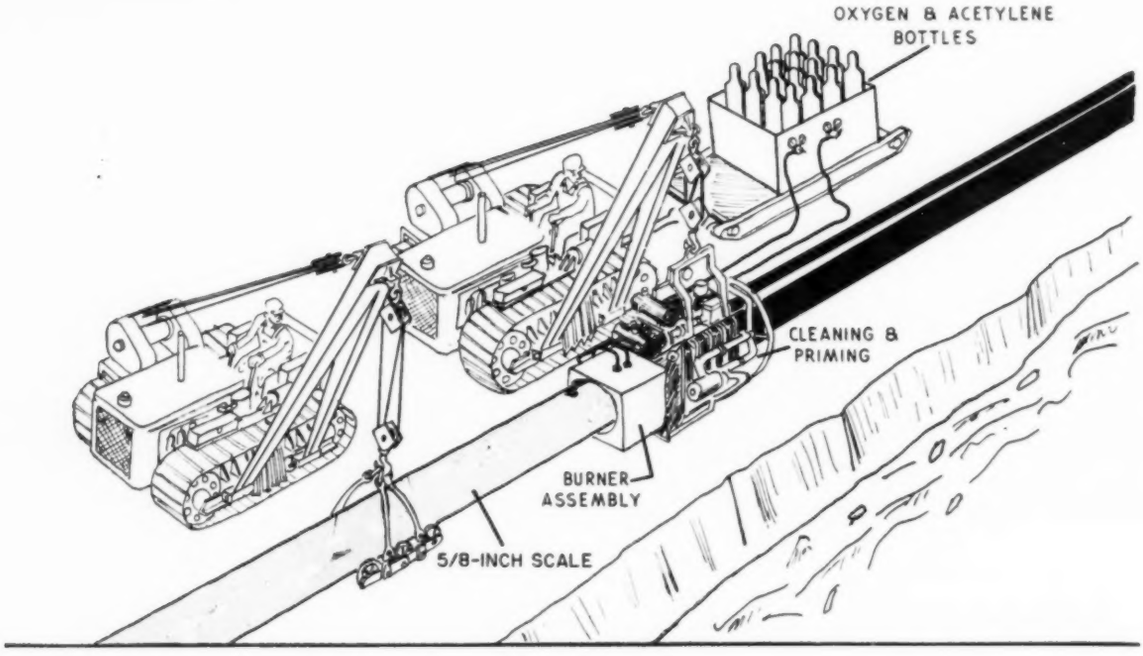


## 7. Drums buoy long shoves...

As MANY as 10,000 empty 55-gallon oil drums were used to buoy up many miles of pipe line during long "shoves" through marsh right-of-way in south Louisiana during 1955.

Contractors have developed the technique to a point where they are floating line as far as 12 miles from a single launching site. Houston Contracting used this method to launch 4 and 5-mile lengths of heavy concrete-coated 20-inch pipe line across the south Louisiana marshes for Tennessee Gas Transmission Company on its Kinder to Pecan Island line.

Soon after, Brown & Root shoved a 12-mile section of 16-inch line using 10,000 drums. Two marsh buggies assisted by towing at the head of line and midway along it where it made a reverse bend of nearly 28 degrees. Using this technique, the contractors were able to construct long distances of line in the marsh where right-of-way difficulties prevented digging of canals for barge operations. (See PIPE LINE INDUSTRY, May, 1955, page 58 and January, 1956, page 32.)



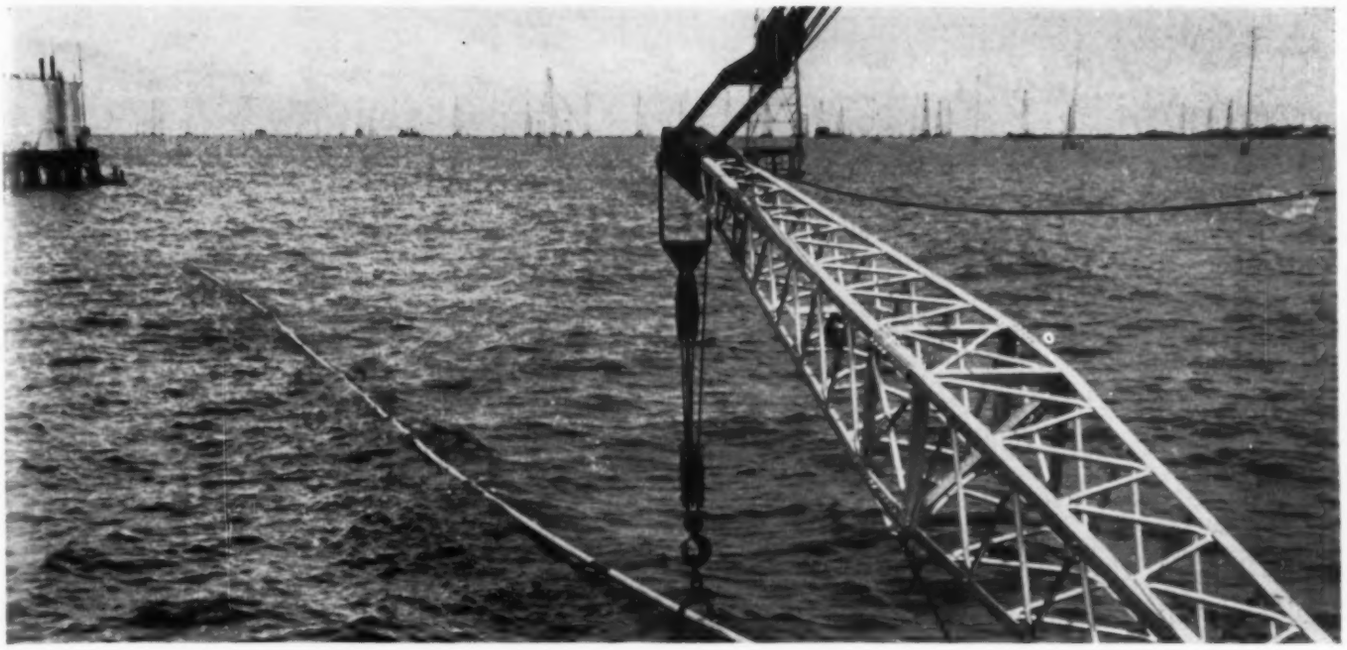

## 8. Flame cleaning reconditions pipe at few cents a foot . . .

WHEN A PIPE LINE has been buried for some time and has accumulated a thick coating of oxide scale, reconditioning and coating leads to unreasonably high cost.

One company developed a flame cleaner using acetylene and oxygen which rapidly heats scale ahead of the cleaning machine. Because of the difference of coefficients of expansion of the oxide and metal plus moisture content of the oxide, heat of the flame jets causes the oxide to expand with considerable force loosening it from the pipe.

The machine has been used for over-the-ditch reconditioning on approximately 40 miles of pipe varying in size from 3½ inches to 12¾ inches. Pipe was uncovered, cradled out of the ditch and laid on skids; then the cleaning machine ran along the line just like a conventional machine. Temperature of the pipe being cleaned was regulated by increasing or decreasing rate of travel of the cleaning machine.

In low gear, the machine propels the flame at a speed of 500 feet per hour making cost for flame cleaning 9.42 cents per lineal foot of pipe, or approximately 2.8 cents per square foot of surface on 12¾-inch pipe. In cleaning 40.35 miles of pipe 3½ inches to 12¾ inches in diameter, oxygen and acetylene cost was $13,100 or an average of 5.7 cents per foot. (See PIPE LINE INDUSTRY, April, 1955, page 38.)



## 9. First aluminum crude line laid in Lake Maracaibo . . .

A NEW 1000-FOOT, 4-inch line recently laid in the corrosive, brackish waters of Lake Maracaibo will be watched closely by offshore pipe line operators and corrosion engineers. The lake water is highly corrosive to uncoated steel, and a small marine animal, the teredo, attacks coating on underwater lines.

The 4-inch, 0.237-inch wall thickness pipe was supplied in 40-foot sections. It was submerged in 15 to 20 feet of water. Each joint weighed only about 150 pounds so it was necessary to anchor it with 280-pound concrete weights every 40 feet. The line, which was hydrostatically tested to 500 pounds per square inch, will operate at about 200 pounds.

Installation of the line began by double jointing sections. It was then welded into a continuous line from Creole's lay barge using an inert gas-shielded, tungsten metal arc machine. Aluminum risers connect the line to the well and to the flow station.

## 10. Wire rope, concrete steady submarine lines . . .

DURING CONSTRUCTION of the submarine pipe line in the Bay of Bombay, Collins Construction Company controlled the great effect of broadside current force by anchoring the underwater line with concrete blocks.

They cast reinforced concrete anchor blocks weighing five tons and spotted them on shore-based ranges at intervals of 500 feet down the line and 500 feet away from the center line on either side. To these blocks, divers clamped 850-foot links of wire rope, and using the ranges, positioned the clamps on the free ends to coincide with the center line of the individual line laid. Seven lines were laid in this operation.

Before each 1200-foot section of line was launched, clamps were bolted to it every 500 feet to match the pairs of anchor blocks. Then the line was launched during slack water, and after being towed to position, the guys were fastened to the clamps. Once in place, the pipe line was held in position with little affect by the tides. Tides ranged as high as 18 feet. (See PIPE LINE INDUSTRY, February, 1955, page 40.)

## 11. Internal coating of lines in place gains . . .

1955 SAW AN INCREASE in the application of plastic type protective coatings to the internal surfaces of crude gathering lines in place. Lines up to 35 miles in length have been coated.

The line is first cleaned using scrappers and brushes to remove most of the oil, water, and scale from the pipe walls. Solvents and chemical cleaners also can be used to clean the pipe thoroughly. Final cleaning is accomplished by forcing a batch of volatile solvent through the line.

Plastic coatings are then applied by forcing slugs of paint ahead of and between specially designed plugs propelled by clear, dry compressed air. One or more coats may be applied depending upon the property of the coating material and thickness desired.

Early applications were with vinyl type coatings and phenolic compounds of the catalytic setting type. There is now high interest in the use of epoxy resins in this application. As application techniques improve, coating of gathering lines of increasing lengths will become more practical. (See PIPE LINE INDUSTRY, March, 1955, page 46 and December, 1955, page 40.)

1 The shove station was located on this high spot of ground near Cameron, La., and Brown & Root assembled equipment here. Single joints were "stovepiped" to the line and shoved out into the marsh a distance of nearly 12 miles on American Louisiana's new South Texas to Detroit line.

# THE BIG PUSH

## 12 million pounds of pipe laid in a 12-mile shove without digging a flotation canal.

**Here's how the contractor solved the problem successfully by using high ground work stations and old oil drums.**

"Too THICK to drink and too thin to plow"—a pipe line contractor's description of the South Louisiana marsh country is a good one. It was through this terrain that Brown & Root, Incorporated, recently completed a record length pipe line shove, floating the 12-mile length of concrete-coated 16-inch pipe using empty oil drums. Up to seven 55-gallon drums were wired on to each joint. Over 10,000 drums were used to keep the 12,421,000-pound string afloat.

Landowners had objected to the digging of a flotation canal so the line could be laid from a barge in a conventional manner. To overcome this objection, Brown & Root decided to dig a ditch and shove the 12 miles of line from a work station on high ground. Draglines mounted on marsh buggies were used to dig the ditch. Equipment was assembled at a shove point about three miles east of Cameron, La.

Here the sections of concrete-coated pipe, each weighing about 10,000 pounds, were stockpiled as they were trucked from the yard. Two sheltered work stations were set up for "stovepiping" operations. At the first, a new joint of pipe was lined up and the stringer bead and hot-pass were run. The fill-in welds were made next and the field joint concrete-coated at the second station. The 55-gallon drums were secured to the line and it was shoved off down the ditch by a winch tractor.

A double bend in the ditch made the job even tougher. About seven miles down the ditch from the shove point, the pipe had to make a 28-degree change in a direction around a long curve and then reverse the bend only a mile and a half away. Brown & Root crews used a marsh buggy tow on the lead end of the pipe to maintain the proper bend in the line to conform to the ditch. Two-way radio communications were used to coordinate operations between the shoving station, the lead marsh buggy, and a center station near the bend.

All welds were X-rayed, and the line will be gas-tested when the entire 38-mile section is completed. The wire bands around the barrels were cut after the line was in place to allow the pipe to settle in the ditch. When gas testing is finished the ditch will be backfilled. In the meantime another 44,000 foot string will be shoved from a lay barge moored in a dredged canal.

**2** Stovepiping a new joint: a joint of concrete coated 16-inch pipe is lined up and welded on to the pipe line. Stringer bead and hot pass are run at first station; fill in weld and concrete coating of joint are completed at the second station. The sideboom was extended to a length of about 25 feet for stockpile work.

**3** 10,000 drums buoy pipe as line moves down into the marsh after each successive new joint is made. As many as seven old 55-gallon drums were wired to each joint to keep it afloat. A joint of pipe weighed about 10,000 pounds.

**4** Bends create problem. At seven miles from the shove point, ditch changed direction 28 degrees. About a mile and a half farther it bent back again. To keep the pipe from going "aground" a marsh buggy pulling on the lead end of the pipe maintained the proper bend. Condition of line was observed at the bend, transmitted to the lead end and shove points by two-way radio.

# How Transco Isolates Outside Fires

**At Transco's Manhattan meter pier—should a harbor fire occur—within 30 seconds after the alarm this station can be blanketed with 1200 gallons of water fog per minute from 40 sprinkler heads.**

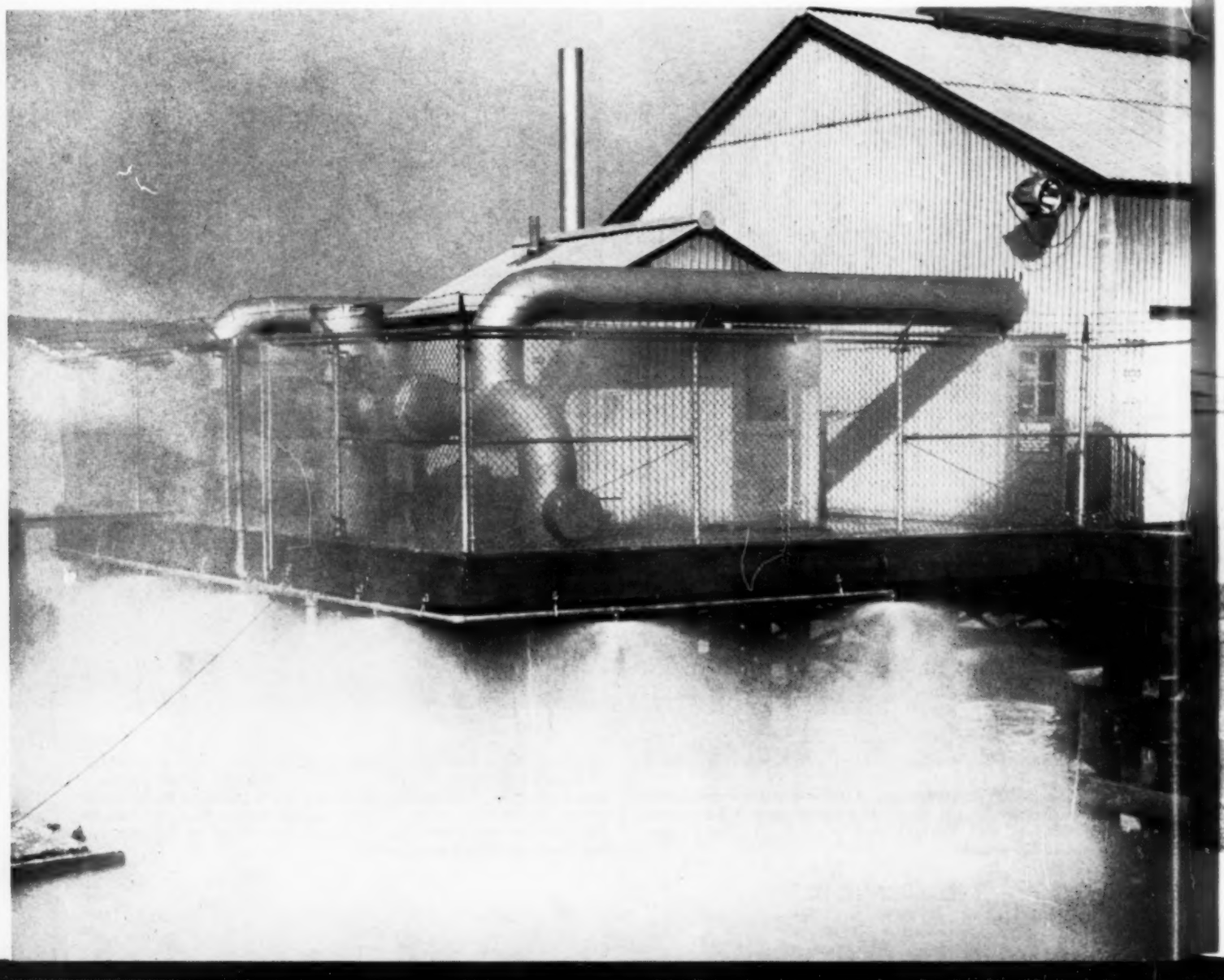
SAFETY ENGINEERS of Transcontinental Gas Pipe Line Corporation have accomplished what all pipe line companies strive for—isolation of a facility from outside fire hazards.

They did this at their New York City meter station. The meter station is located at the foot of Manhattan island. Nearby is an excursion boat pier and a wooden coal loading dock. Harbor barge traffic in the area is heavy. These exposed the meter station to damage from outside fires.

To offset this hazard, Transco engineers designed and voluntarily installed a sprinkler system capable of surrounding the station with 1200 gallons of water per minute in the form of a fog blanket. Transco has a second entry to New York City via its Narrows crossing.

For emergency use and testing, Transco purchases water from New York City's fire department. The pier station is supplied from a 12-inch city fire main about 200 feet from the pier. Transco's system takes off from a wet tap made into the main with a 6-inch line fitted with a fire department cutoff valve. A cast iron cap buried two feet underground protects this valve from traffic and loiterers.

To measure the volume of water purchased, a fire-flow meter was installed in a concrete pit near the pier. The compound-type metering arrangement permits accurate measurement with an extremely low pressure drop. It consists of a proportional



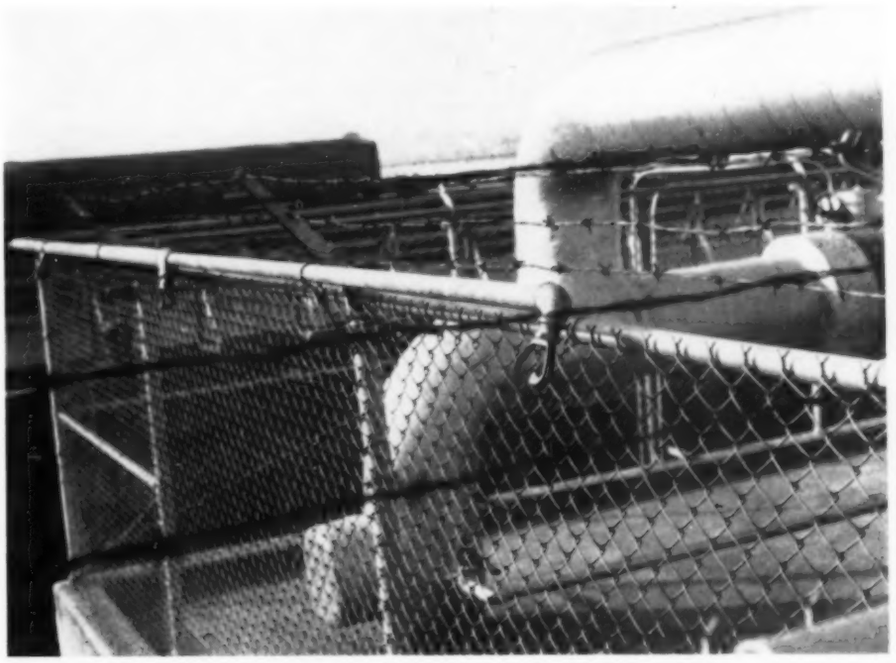
meter and an automatic valve on the main line and a disc meter on a by-pass. In actual tests, the difference between static pressure and flowing pressure was less than 0.5 pounds per square inch at a flow rate of 1200 gallons per minute. A 6-inch gate valve is installed on each side of the meter. Pelleted insulation in the water tight pit protects the fire system meter installation from freezing temperatures.

A 6-inch, 9/16-inch wall thickness pipe leads from the pit to a T-take off near the meter station where the system divides into two 4-inch lines. Each feeder line is fitted with a post indicator valve which can be locked when not in use. The pit cover and two post indicator control valves are locked by company locks and the keys are kept by the station operator on duty.

In case of fire on an adjacent pier or approaching vessel, the operator immediately unlocks both of the indicator valves and opens them to charge the fog piping system. An opening of 19½ turns on both would produce a fog blanket of 1200 gallons of water per minute in less than 30 seconds.

Transco's fire system supplies water to 40 fog nozzles installed at approximately 10-foot intervals around the station at the pier floor level and at the top of the fence. Exposed piping would not normally contain water unless in use or under test, so there is no danger of freezing during winter. After the system has been used or tested, an automatic drain opens at the lowest point in the system just below the pier gates.

The system has the approval of the New York Fire Department, Marine and Aviation Department, and the New York Fire Insurance Rating Organization. It will be tested periodically and protected by a cathodic protection system. —**The End**



**THE SPRINKLER SYSTEM** around the station has 40 fog nozzles supplied by two lines. Photo at right shows how the system surrounds the top of the fence. It also surrounds the station at the pier floor level. Below is the compound meter arrangement by which Transco measures volume of water purchased from New York City water mains with a minimum of pressure drop even at full flow. Water tight concrete pit is insulated against freezing, kept covered and locked.

**FIRE PROTECTION SYSTEM** under test at Transco's Manhattan metering station is shown at left, with a blanket of 1200 gallons of fog water per minute insulating the pier from surrounding fires. Below, Transco safety director Stanley Owens, designer of the system for the metering station pier, observes the first test as Transco's Charles Quirk opens the control valve.

**AFTER** The completed project with all piping exposed. Easy access is provided to all piping for inspection and maintenance.

# Natural Gas Pipe Line's 'Sunken Gardens'

**The company changes all of the manifolds on nine of the original stations.**

THE BURIED, high pressure gas piping at the nine original compressor stations on the Natural Gas Pipe Line system had been a problem from standpoints of corrosion and maintenance from the time of installation.

This piping, for the most part concentrated in an area where the compressor suction and discharge piping are manifolded into the main suction and discharge headers, is subject to varying temperatures and moisture conditions. This made protection, by coal tar enamel and other protective coatings, difficult.

Scheduled inspections for corrosion were set up but became quite costly since excavation was necessary each time an inspection took place.

Finally, with work starting in 1952, the problem was solved by excavating earth from around the piping. This necessitated several design changes in the pipe itself—to reduce vibration and to reduce stresses caused by expansion and contraction.

The projects have proven quite satisfactory, according to NGPL Compressor Station Superintendent J. G. Barnhart, who said, "Exposing the piping in these areas permits easy access for inspection and maintenance functions."

In 1952 these so-called sunken gardens were completed at Station 107, Emerson, Iowa, and 108, Truro, Iowa; last year at 104, Great Bend, Kansas; 109, Harper, Iowa; and 110, Geneseo, Ill. Stations 102 at Gray, Okla., and 105 at Glasco, Kansas, will be completed this year, and the remaining two, 103 at Minneola, Kansas, and 106 at Beatrice, Neb., are scheduled to be finished next year.

**BEFORE** A view of the manifold area before excavation was started. The building on the left is the main building which houses the gas compressor units. On the right are the cooling towers. These towers cool system water and house the gas cooling coils.

**1** Excavation of the first group of 6-inch sickle-type expansion bends on the compressor discharge lines has been completed and piers poured before installing the new horizontal expansion bends. Except for short periods, the stations were operated at full capacity. Thus from time to time it was necessary to provide some means of holding the pipe after the dirt had been removed and before new supports could be installed. This explains the need for the sandbags shown at left.

**2** Picture below shows the severe corrosion which had taken place, resulting in hazardous operating conditions. Note the nuts on the stud bolts.

**3** A close-up view of the backhoe and conveyors at work.

**4** The excavation required installation of retaining walls. At left, a section of one of the walls is formed and ready to be poured.

ACKNOWLEDGMENT

Information and photographs supplied by J. G. Barnhart, superintendent of compressor stations for Natural Gas Pipe Line Company.

**A construction scene as TGT and Bechtel built . . .**

# A Pipe Line Down 'Main Street'

**Construction crews literally went out of their way to create goodwill in the heavily-populated Westchester county just outside New York City.**

**By Harrison T. Brundage,**
PIPE LINE INDUSTRY Staff

CONSTRUCTING A pipe line through heavily-populated Westchester County just north of New York City posed a real problem for Tennessee Gas Transmission Company and Bechtel Corporation.

How they literally went out of their way to construct the line is a classic example in how to maintain good public relations. This section of the TGT line from the Hebron, Pa., storage field to Greenwich, Conn., will provide a new source of gas supply for the New York City-northern New Jersey metropolitan area.

Virtually all of the land along the right-of-way is in the higher-priced brackets. Many streets, parkways, streams and even a golf course had to be crossed. A maze of utility lines barred the way. Despite the tremendous liabilities, there were no major mishaps and no serious complaints were filed because of construction operations.

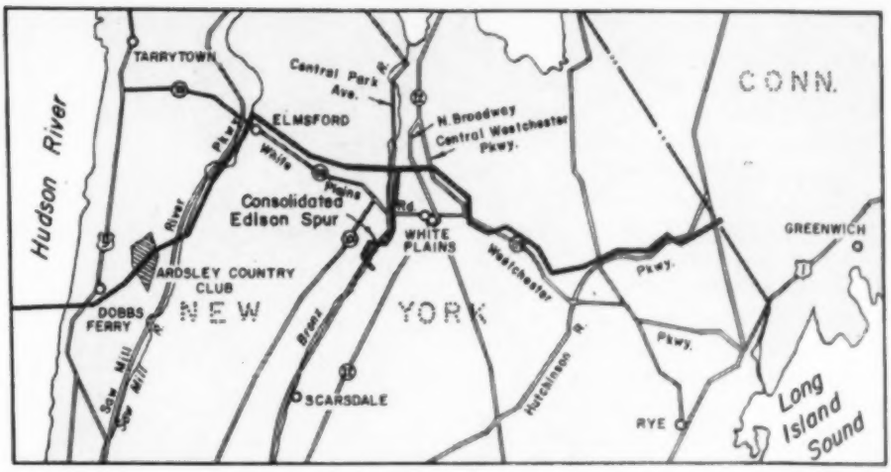
**People Told of Plans.** Thoughtful public relations began even before the start of construction and continued until the job was completed. On April 22, 1955, a public hearing on TGT's construction plans was held at the county courthouse in White Plains, N. Y. Persons representing governmental bodies, municipalities, property owners, organizations, or their own individual interests were given an opportunity to ask questions or register any objections to the proposal.

Construction began about two months later. With it, the company began a thorough program to preserve good will throughout the pipe-

lining job. The program had excellent results. TGT officials have high praise for the public relations conscious attitude displayed during construction by the contractor, Bechtel Corporation of San Francisco and New York.

**Round About Route.** An illustration of TGT's goodwill program in Westchester County is the route chosen. The distance between Dobbs Ferry, at the east bank of the Hudson River, and Greenwich, Conn., on the other side of the county, is about 12 miles as the crow flies. In order to cause as little disruption as possible to private property, the pipe line route begins at the east bank of the river, goes almost due north along a three-mile stretch of the Saw Mill River Parkway to Elmsford, where it jogs eastward through White Plains, the county seat. Thence southeast three miles along Westchester Avenue, where it bends due east to Greenwich to connect with the south end of the New England portion of TGT's system.

As a result of this circuitous route, there are 16 pipe line miles, where about 13 miles might have done the job with less cost and difficulty to the company. Eleven of these pipe line miles are on Westchester County Park Commission property leaving only 28 private property owners with whom the company had to deal.




**1** The goodwill route took 16 pipe line miles that needed only 13. Heavy black line shows pipe line route.

**Fore, Please!** Another instance of the company's consideration for private land owners is pointed out by what happened at the fashionable Ardsley Country Club. The pipe line's route crosses part of the club's golf course. Originally, the club authorized the pipeliners to go through during a week in September. But this week later on proved to be the date re-

**2** Bechtel crews doubled as golf course architects. After the line crossed the Ardsley Country Club course (above), the contractor resodded portions of the course.

**3** Heavy rains which swept the eastern seaboard last fall made the job even tougher. At right, a ditch is being pumped out prior to laying the line.

served for a club tournament. Obligingly, TGT postponed the work.

The club had excellent weather for the tournament, but the postponement caused construction crews to encounter the same drenching rainstorm that caused Connecticut's second flood of the season in October. After the pipe was laid the contractor restored the fairways to the satisfaction of the club. And the pipe now lies three to four feet below the surface, well beneath the divot-scooping range of even the worst duffers.

Throughout the Westchester work the contractor was faced with the shallow, sticky, loose glacial soil, often containing big, erratic boulders, which lies immediately atop the tremendously hard Manhattan schist that anchors Gotham's skyscrapers. Even on the golf course some blasting had to be done to make the trench deep enough on a steep hill. A seismographic record was kept on all blasting.

Due to the heavy rains the Saw Mill River, sand-bagged off at normal water level, flooded out scheduled work at the crossing at Elmsford before it could finally be completed. On the Consolidated Edison spur, which extends two miles south of the main pipe line along the Bronx River, the stream was crossed four times over this distance.

On the last crossing, a combination of huge bolders and sticky sand under the New York Central Railway trestle made it impossible to drill a horizontal hole any farther than about halfway through. So a short section of 24-inch pipe was filled with sand, capped on both ends and suspended pendulum-style from a dragline. Then it was used as a battering ram to drive the pipe through by slamming against the protruding end of the pipe.

In addition to the liability hazards engendered by the streets and parkways, TGT had to contend with a maze of telephone conduits, gas lines, water mains and sanitary and storm sewers. Also, there were four major water carriers—the Catskill, old and new Croton and Bronx River Aqueducts—which had to be traversed by the pipe line. These aqueducts supply New York City with 1 billion gallons of water daily.

Thus there were plenty of major items with which the contractor had to exercise the most minute care. But the Bechtel Corporation was careful and patient with the little things too: Reseeding, resodding and refertilizing the parkway and private grass areas, restoring damaged stone fences and minimizing and avoiding damage to trees.

**4** Crews were forced to cross all kinds of underground lines. Here a crew works at night to install a section of TGT's line under another dual line.

**Future Safety Emphasized.** According to regulations of the Public Service Commission of New York a pipe line with more than 250 pounds per square inch pressure cannot be constructed within 100 feet of a habitable structure without a variance from the Commission. Many such variances had to be acquired. The pipe line was hydrostatically tested to 1200 psi. All welds were X-rayed, and insulating flanges and numerous test leads were installed for checking cathodic protection on the line.

The pipe used in Westchester is 24-inch outside diameter seamless, with a wall thickness of one-half an inch. It weighs 125.49 pounds per foot, and individual joints are from 35 to 45 feet long. The pipe was expanded by cold process.

The coating specifications, from the pipe's surface outward, called for coal tar primer, 3/32-inch modified coal tar enamel, glass fiber wrap drawn into the coating, glass felt, 3/32-inch coal tar enamel again and, finally, perforated asbestos felt.

The Westchester County project was part of a 24-inch, 250-mile pipe line constructed by TGT from Hebron, Penn., to Greenwich, Conn. The last section of the line, from the west bank of the Hudson River to a point about 12 miles to the west was completed early in December. Pipe-pulling across the Hudson from the Palisades to Dobbs Ferry, N. Y., was finished on Oct. 31. (See PIPE LINE INDUSTRY December, 1955, pages 28-32.)

The new pipe line completes a 1000-mile, five-state loop that will provide TGT's customers, both in the New York City area and in New England, with flexibility of service by means of alternate routes of supply. Normally, the New York City-northern New Jersey area will be supplied through the southern arc of the loop, which runs from Mercer, Pa., by means of a previously-completed pipe line, to Hebron and then on to Greenwich through the new line. But, if necessary, this area can be supplied through the northern arc of the loop. The northern arc runs from Mercer through points near Buffalo, Rochester, Syracuse, Utica and Albany in New York; near Springfield, Mass., and then southward through Connecticut to Greenwich. Conversely, northern New York and New England customers can be supplied through either of the two arcs of the loop.

TGT is developing three natural gas storage fields in Pennsylvania and New York, all of which are linked with the loop. They are—the Hebron and Harrison storage fields in Pennsylvania and the Colden storage field near Buffalo, N. Y. When fully developed, they will have an annual storage capacity of approximately 35 billion cubic feet. These three fields plus two other nearby fields in which TGT has an interest, will have a storage capacity of about 77 billion cubic feet, with the ability to provide 770 million cubic feet a day for 100 consecutive days when the present underground storage developments are completed.

The new Hebron-Greenwich line will deliver natural gas to Consolidated Edison Company of New York, Inc., Brooklyn Union Gas Company, Public Service Electric & Gas Company of New Jersey, Long Island Lighting Company, and Rockland Light & Power Company.—**The End**

# Oil Pipe Lines are Vital to Nation

**This expanding transportation system's rate of growth is almost double that of other cross country ton-mile traffic. Mileage now nears 75 percent of all trunk line railroad trackage.**

By **GORDON C. LOCKE,**
Executive Secretary, Committee for Pipe Line Companies,
Washington, D. C.

PETROLEUM PIPE LINES play an essential role in this nation's transportation system. Although these underground arteries move only one commodity in only one general direction they nevertheless transport 16 percent of the total volume of ton-mile intercity traffic. Illustrative of the enormous growth of pipe line transportation is shown by the fact that pipe line ton miles increased from 6 percent of total traffic in 1929 to 16 percent today, whereas ton miles of all intercity traffic has only about doubled. Presently the 16 percent represents an aggregate of 179 billion ton miles.

When the movement is confined wholly to petroleum, however, the pipe lines deliver 76 percent of the crude oil reaching refineries and 18 percent of the refined products reaching points of consumption.

Since inception of the oil pipe line, some 90 years ago, its development has been rapid; mileage has increased tenfold in the past 50 years. In 1900 there were only 18,000 miles of oil lines; it is conservatively estimated the total would reach 180,000 miles at the end of 1955. This amounts to approximately 75 percent of the mileage of all trunk line tracks operated by railroads.

During the first eight months of 1955 total domestic crude oil receipts at refineries by all modes of transport averaged about 6,668,000 b/d of which 5,584,000 b/d, or 84 percent, was delivered by pipe lines. In addition to being capable of moving this volume of oil, the pipe line companies at the request of the government have built up spare capacity sufficient to move crude oil from most of the important producing areas should it be necessary in case of war to step-up production to maximum efficiency rates. Normally, pipe line capacity is maintained only at a rate sufficient to meet current peacetime needs.

**Defense?** The dependence upon water transportation for nearly 3 million barrels daily of petroleum supplies for meeting the East Coast demands has given the National Security Council considerable worry in connection with national defense planning. Recall the crisis this country experienced during the early stages of World War II when the movement of petroleum to the Eastern Seaboard in tankers practically was eliminated due to submarines and it was necessary to develop as rapidly as possible a substitute system of overland transportation. This resulted in building the "Big Inch" and "Little Big Inch" government-owned pipe lines which were sold after the termination of hostilities for the transmission of natural gas. The government, however, retained the right to recapture both lines in event of another national emergency.

The combined capacity of the former government-owned 24 and 20-inch lines during the war was 535,000 barrels daily. Oil demands have increased appreciably and their present capacity would be insufficient to meet current civilian and military requirements even with rationing. While the East Coast is still a weak link in mobilization planning, studies of several proposed projects to remedy this situation are receiving serious consideration by defense mobilizers.

**Products pipe lines show steady growth.** The use of pipe lines for the transportation of gasoline and other light products came into existence 25 years ago. In 1930 there were only 371 miles of such lines. Prior to World War II there were only 9000 miles of such lines. Today, it is estimated that there are more than 32,000 miles of refined oil pipe lines located in 40 states and the District of Columbia.

The greatest expansion has occurred in the postwar period. Deliveries of refined oils by the products pipe lines have increased progressively from 234,000 barrels per day in 1938 to more than 2 million barrels daily in 1955. In 1938 the products pipe lines were delivering only 16 percent of the total domestic demands for light products—gasoline, kerosine, and distillate—whereas in 1955 the lines delivered 37 percent of these demands.

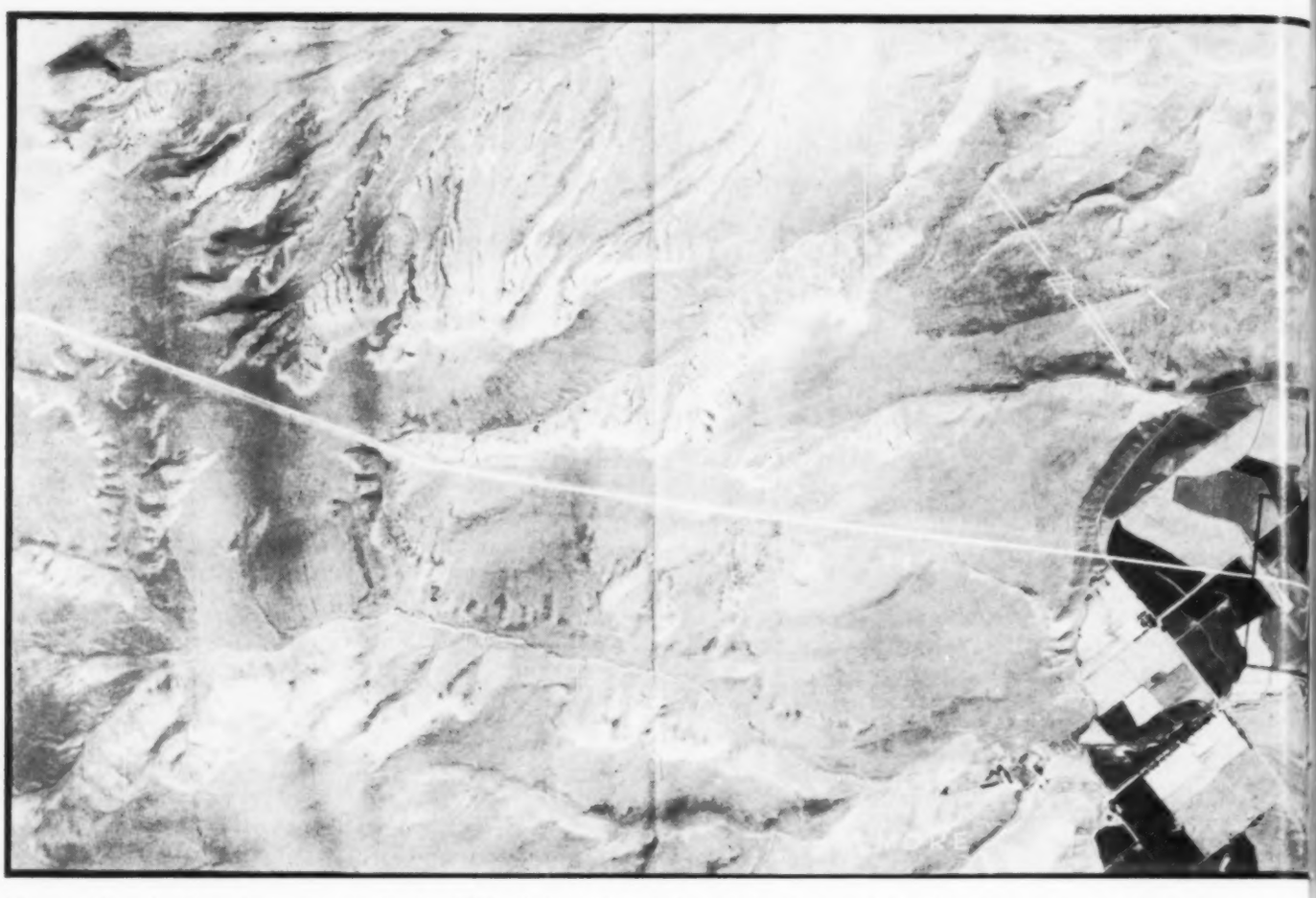
**Pipe lines represent $2.5 billion investment.** Interstate Commerce Commission statistics for the year ended December 31, 1954, shows 83 interstate pipe line companies filed reports representing some 77 percent of the total mileage of all pipe lines in the U. S. These companies had a combined investment in carrier property of $2.5 billion. The operated mileage was 138,962. They had a net income of $124.4 million after deducting taxes and interest on long-term debt. The ratio of operating expenses to operating revenue before taxes was 53.74 percent, a favorable figure compared with railroads' 76 percent and trucks' 96 percent.

**Growth continues.** Between the years 1946 and 1954, the pipe line companies reporting to the Interstate Commerce Commission have expended more than $1.8 billion for new construction and improvements. During this nine year period, 41,000 miles of principal petroleum pipe lines have been built, including 23,000 miles of crude oil lines and 18,000 miles of products lines. This by no means represents a net gain as many of the older multiple small diameter pipe line systems have been retired and replaced with single large diameter pipe thus providing less mileage but greater carrying capacity.

**Revenues are up, too.** So far as accomplishments are concerned 1955 was another year of outstanding progress for the pipe line industry. Transportation revenues were running 8 percent above 1954 and the volume of oil moved was exceeding that carried in 1954 by 8.5 percent.

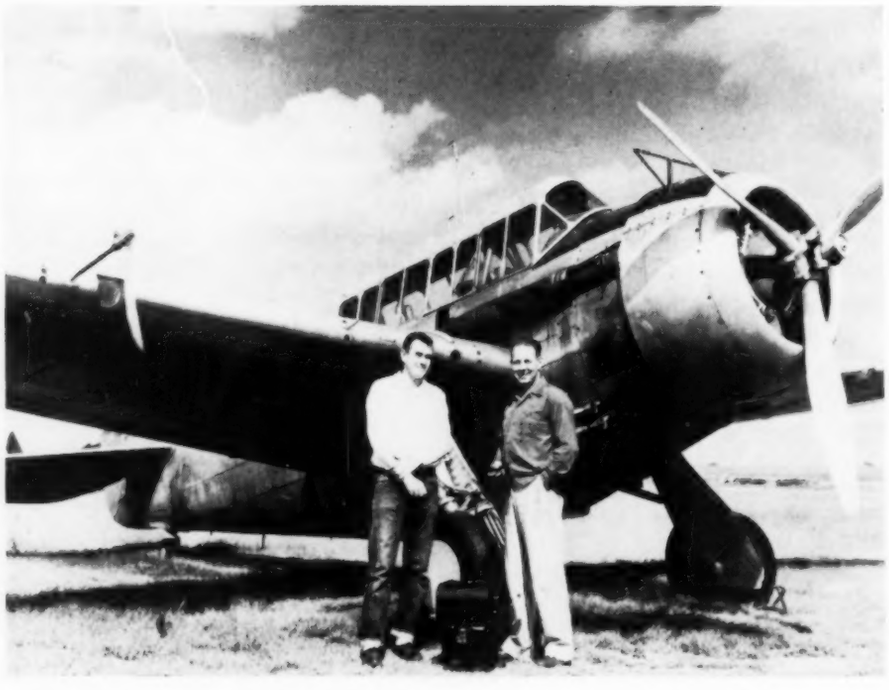
ACKNOWLEDGMENT

Abstracted from a paper presented before the Transportation Session, 35th Annual Meeting of the American Petroleum Institute, San Francisco, November 15, 1955.



Alignment blueprint from the master mosaic of a 3000-mile-long photograph made by the crew below. Pipe line construction engineers used it

# A 3000-Mile-Long Photograph



Cameraman Roland Holmes (left) and pilot W. T. (Bill) Galliard ready for take-off. On the ground between them is a single lens precision aerial mapping camera used for right-of-way survey.

**By ANTHONY GIBBON**
World Oil Staff

A PHOTOGRAPH approximately 3000 miles long has been successfully shot and developed for Fish Northwest Constructors, Inc., of Houston, who are constructing the world's longest natural gas pipe line for Pacific Northwest Pipe Line Corporation.

Actually, the photograph is a series of some 2000 separate shots which comprise a photographic mosaic and, when joined together, furnish an accurate picture of the miles of terrain over which this giant line is to be laid.

as a working sheet. This represents application of a new technique in aerial photography, replacing old time-consuming mapping procedure.

# Shot for Pacific Northwest

Much of the pipe line right-of-way lies in the Rocky Mountain region. The system taps three of the world's biggest gas reserves, and runs from the San Juan Basin to the Canadian border near Vancouver, Canada. The 20-inch to 24-inch line, which starts in the northwestern part of New Mexico, goes to Rock Springs, Wyo., and on up through Utah, Idaho, Oregon and Washington. It continues to the Canadian border where Westcoast Transmission Company Ltd., will connect with its main gas pipe line from Edmonton, Alberta, to Vancouver. This line will go into operation in 1956.

The Pacific Northwest right-of-way is probably one of the toughest ever selected for construction of a pipe line, and its aerial location presented a problem. Some consider it the most difficult ever undertaken.

Of special significance and testifying to the engineering work of Fish Northwest Constructors, is the fact that, regardless of the problems posed by rough terrain, when aerial work was completed, approximately 90 percent of the original right-of-way as selected proved a feasible route. Only 10 percent of the line had to be rerouted.

Two planes were used for the mapping job with single lens, precision aerial mapping cameras. Single shots covered three square miles of terrain, flying three miles above the ground.

Under ideal conditions the job of shooting the 3000 miles of right-of-way could have been done in a little more than a week. Weather, however, which posed the greatest problem, slowed down the crews, and it took the two planes approximately three months to complete the job.

Work of photographing the tentative right-of-way started in August, 1954, when the first plane was sent to the starting point near Farmington, N. M., center of the big San Juan Basin gas field. Even there, clouds banked the skies almost daily, making it impossible for the planes to fly.

To get perfect aerial pictures, the technique requires absolutely clear weather. This weather problem became more serious as the work progressed towards the northwest terminal of the line. The second plane was based at Pendleton, Ore.

So-called normal weather conditions prevailed over the line of flight from the San Juan Basin area to Portland and the Canadian border. By normal, it was explained that the crews did well to get one flying-day in seven. The time was further cut down from one to two hours when it

Assembly of the master mosaic by technicians who are making a pasteup from the 2000 aerial mosaics taken by the crew. Technicians are working with aerial alignment negatives, which take the place of normal mapping procedures, saves plenty of time.

was clear enough for the cameras to shoot. The worst "soup" encountered was west of the Cascade range to Sumas, Canada, where heavy clouds prevented the planes from carrying out their mission for days.

Besides the main right-of-way being photographed, a lateral gas line running from Rock Springs to Denver was done under separate contract for the Colorado Interstate Gas Company, Colorado Springs, and covered approximately 365 miles. This line ties into the Pacific Northwest line. Both main line and lateral will serve some 30 communities.

Despite weather hazards and the fact that the planes had to fly about 22,000 feet above sea level, no operational difficulties were reported, although the surveying company had to change one of the planes' engines.

In connection with this aerial survey, one of the most important applications of aerial photography was applied in assembling the data from the 2000 aerial mosaics. All photographs were shipped into Tulsa headquarters where aerial alignment negatives were prepared. The aerial alignment negatives take the place of normal mapping procedure which is extremely time-consuming.

The alignment blueprint sheets carry such information as right-of-way ownership, alignment detail, pipe detail on construction, detail on construction and design of pump stations, as well as a profile of the entire line. Blueprint reproductions, made in any quantity from the master negatives, can be used by engineers and then discarded.

Some 400 separate alignment negatives already have been prepared in connection with the project which covers the main pipe line right-of-way of some 2000 linear miles to the Canadian border now under construction. The negatives cover an area of five miles in minute detail. They are put up in sizes of five inches to the mile as compared to three inches to the mile on the original master mosaic.

Additional mileage included in the complete 3000-mile survey covers the Canadian portion of the line as well as rights-of-way for the laterals which will be included in the system.

Figure 1 is a reproduction of an alignment sheet before data required by the engineers were added.

—**The End**

Completed aerial maps are delivered to the client in these special containers to faciliate handling. Cylinders contain master mosaic rolls. Boxes are for booklike storage of contact prints.

*Shovel-Crane owners!*

# sharing your profits with old-fashioned clutches?

**Remember the day the weather was fine, footing good and the hoes were really boiling rock...**

THAT was the day you thought the job was going to move out ahead of schedule. But the clutches were getting hotter all the time. By mid-morning, hoes began going down for clutch adjustment—the heat had done it. After the noon break, the same thing happened. How much footage do you figure you were penalized for having hoes with old-fashioned clutches?

**Avoid costly downtime**

With a Link-Belt Speeder you get modern power, hydraulic-actuated clutches that automatically compensate for heat and normal lining wear. In fact, most Link-Belt Speeder owners will tell you these clutches are so good, adjustment is needed only once or twice a month.

It's just one of many ways you're big money ahead with a Link-Belt Speeder.

Get the complete story from your distributor. He'll show that whatever rigs you need—crawler or rubber-tired . . . ½ to 3-yd. 8 to 60-ton capacity—you'll earn bigger return on your equipment dollars with a Link-Belt Speeder. Or write for literature—LINK-BELT SPEEDER CORPORATION, CEDAR RAPIDS, IOWA. 13,902

**LINK-BELT SPEEDER**

*Builders of a complete line of crawler and rubber-tired shovel-cranes.*

# How to Batch Gasoline Through Crude Lines

**Contamination?—Here's what one company did to virtually eliminate costly reprocessing.**

- Spent three years testing methods and techniques that resulted in batch shipments 95-97 percent clean.
- Almost eliminated reprocessing costs.
- Utilized terminal tankage once used for storage of contaminated natural gasoline, as working storage for crude.

**By C. N. ADAMS,** Assistant District Superintendent
Phillips Pipe Line Company, Odessa, Texas

TODAY'S ECONOMIC situation in the petroleum industry makes mandatory the most profitable use of all components of our natural petroleum resources. Natural gasoline, usually produced at a plant located in the gas field, often must be transported a considerable distance to its place of ultimate use by rail or truck since plant output may not justify a products pipe line. The tariff in such cases makes its use as blending stock an expensive ingredient of the finished product. Occasionally natural gasoline is mixed with crude oil for pipe line transportation to the refinery, but this arrangement is seldom desirable to the refiner because of unusual plant operation when handling such a mixture. Hence, when capacity is available in crude-oil lines, question is often asked: "Why not ship natural gasoline through these lines in batches?"

In answering this question it has been found that the movement of natural gasoline in batches through crude-oil pipe line systems often results in considerable loss to the shipper because a large portion of each shipment loses its original identity because of contamination and must be reprocessed. Since this reprocessing is an additional cost, it is readily seen that the reduction of contamination and resulting product degradation is a highly desirable goal.

Batch shipments of natural gasoline through a common carrier crude line in Oklahoma were begun in 1951. Shipments originated at the tank farm of a gasoline plant and were delivered to a crude-oil terminal more than 100 miles away. Product mixing was so great during the first batch shipment that it was necessary to reprocess all of the gasoline.

The cost of reprocessing the contaminated natural gasoline was considered excessive by the shipper, and the natural gasoline was moved by another means. This loss to the pipe line caused it to take steps to provide better service. Upon assurance by the pipe line carrier that a satisfactory solution would be worked out, the business was returned.

In an effort to reduce the percentage of each batch received as contaminated natural gasoline requiring reprocessing, a series of studies was begun from which the background for this article is taken. The primary objectives were to maintain Saybolt Color and ASTM gum content at destination equal to that at origin point.

Contamination had resulted from the mixing of natural gasoline with crude oil and from the suspension in solution of miscellaneous foreign matter in such proportions as to lower the Saybolt Color index or to increase the ASTM gum content, or both.

**Factors Affecting Contamination.** Investigation revealed that the factors affecting contamination are dependent on the internal condition of the pipe, the method used to clean the line internally prior to gasoline shipments, the medium used for separation of the interface, the rate of flow during movements, and various techniques of operation.

The internal condition of the pipe was the outstanding factor affecting contamination. The line through which these batch shipments were made was constructed in the late 1920's of second-hand 6- and 8-inch pipe and had received only the repairs necessary to provide continuous operations. It was generally known that internal pitting existed and that many areas had been half-soled or full-soled during line repairs. It was apparent that these conditions must be recognized since they affected the deposition of paraffin on the pipe walls, the selection of cleaning equipment and separating mediums, and the technique of operations.

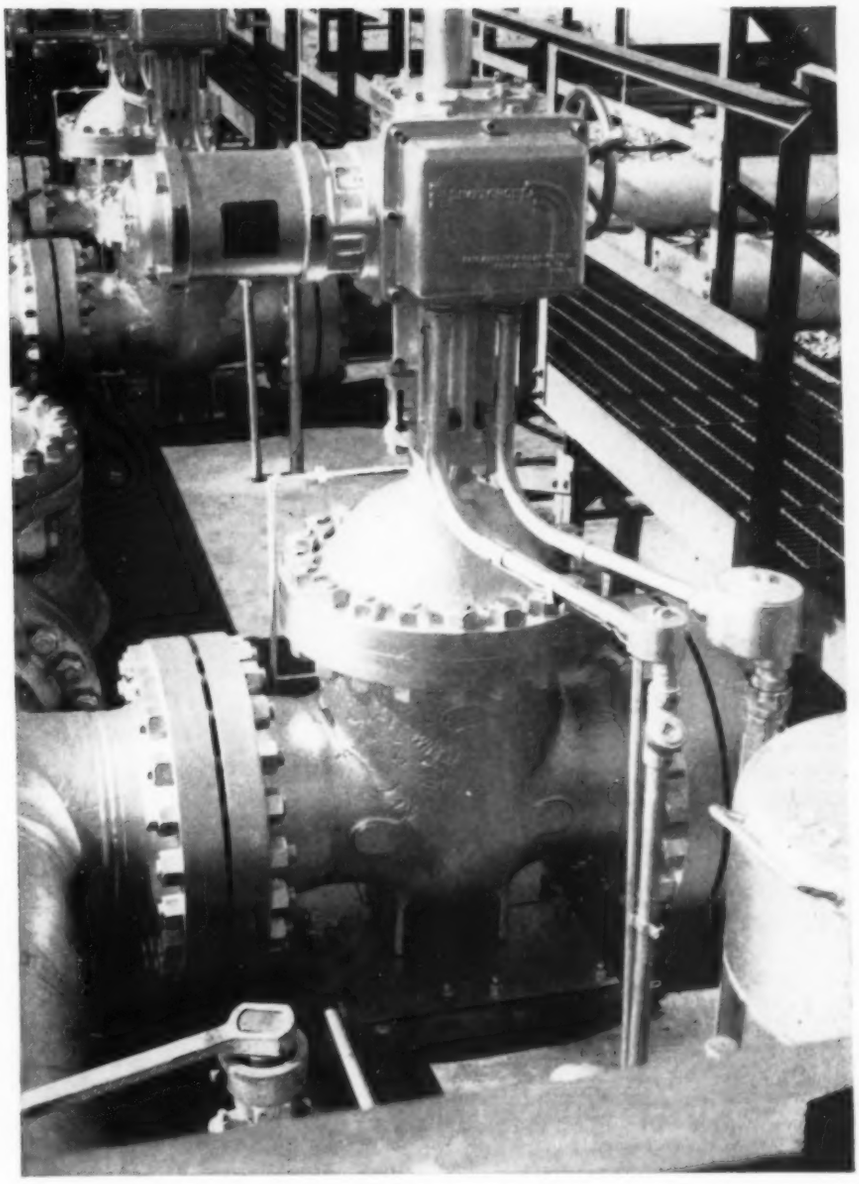
### Methods Used to Decrease Contamination

**Internal Cleaning.** Experience gained through observation of the first few shipments of gasoline pointed to the need for selecting a method of cleaning the line internally prior to making each shipment. From the discoloration noted in the initial shipments the removal of the accumulated foreign matter such as scale, rust, and

DARLING VALVES

# How they cut down time in pipe line service . . .

# with DARLING Revolving Disc GATE VALVES



*Electrically operated 16" x 12" x 16" venturi-type Darling* fully revolving double disc parallel seat *gate valves on a main line station.*

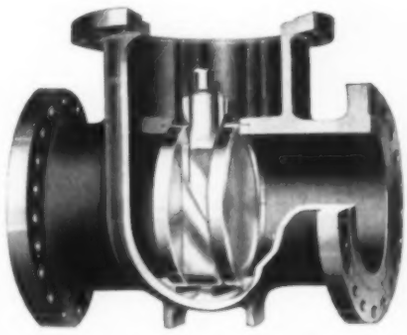
"*What a difference!*" . . . That's an expression often heard after Darling *fully revolving double disc parallel seat* gate valves go on the job.

In applications like this, these unique Darling valves show off their advantages well.

For example, Darling revolving disc gate valves successfully compensate for valve body distortion . . . they close tight every time! In addition, wear on discs and seats is *uniform*. These important parts just naturally last longer. After years of trouble-free operation should it become necessary to service the valves, the four working parts can be replaced on the spot . . . without removing the valves from the line.

## GET ALL THE FACTS

Darling valve users are our best salesmen . . . we invite you to check with them. In the meantime let us send you a descriptive bulletin giving cost-saving facts. Just outline your specific service needs. State whether you are interested in main line, gathering, tank farm or other gas and oil line service. Darling valves can save you a lot of costly, time-wasting valve trouble in the future.



*Cutaway showing complete simplicity of the Darling* fully revolving double disc parallel seat *cast steel gate valve. Notice the four working parts . . . two interchangeable, no-pocket discs and two husky wedges. Maintenance is easy, assembly foolproof.*

**DARLING VALVE & MANUFACTURING CO.**

**Williamsport 27, Pa.**

*Manufactured in Canada by Sandilands Valve Manufacturing Co., Ltd., Galt 19, Ontario*

dirt imbedded in the congealed paraffin on the pipe walls would be a forward step toward reducing contamination. Therefore the selection of the type of scraper best suited for this purpose was the first problem considered.

Prior to the time movement of natural gasoline was begun, a knife-type scraper had been run at infrequent intervals to remove the paraffin. As the initial step after batch shipments were begun, a schedule for running the knife-type scraper was established, and a few days preceding the gasoline shipment one knife-type scraper was run in the customary manner. While this procedure afforded some relief it did not significantly decrease the percentage of contaminated natural gasoline delivered at destination.

The use of a wear-compensating brush-type scraper was considered but the presence of numerous miter welds in the line prevented use of those available on the market. This problem was overcome when the manufacturer made a swivel-joint model. Using these swivel-joint wear-compensating brush-type scrapers an intensive internal cleaning program was begun. Several schedules were tried, varying the time by which each scraper preceded the gasoline and the frequency with which scrapers were run during interim periods when no gasoline was moved. The results were gratifying since the percentage of contaminated natural gasoline was reduced to less than 35 percent of the total volume received during these trials.

These results were interpreted as an indication that a suitable method of internal cleaning could be found by the use of the wear-compensating brush-type scraper properly scheduled immediately preceding each shipment. Through continued experimentation it was found that the ideal scraper program involved the use of three brush-type scrapers run 24, 4, 1 hour prior to the front interface of the crude oil and gasoline, plus one brush-type scraper per week when no gasoline was being moved.

In an attempt to improve the efficiency of the internal cleaning program using brush-type scrapers, two successive shipments were preceded by slugs of crude oil having higher gravity than that ordinarily moved through this line. The pumping of higher gravity crude immediately preceding batch shipments apparently reduced the amount of contamination encountered, but due to the inability to correlate the results obtained with information gathered on other shipments, and the unavailability of high-gravity crude stock, no definite conclusion regarding its effectiveness was possible.

**Mixing at Interface.** Run concurrently with the scraper program was a project intended to eliminate product mixing at the interface. Initial trials using rubber batching plugs to separate the crude oil from the gasoline seemed to maintain a minimum volume of mixture at the interface. Although this appeared to be the answer, the gum content of those shipments in which batching plugs were used was appreciably higher than those batches where no medium of separation at the interface was attempted. This was attributed to increased pipe wall scrubbing by the rubbers on the batching plugs causing imbedded paraffin to be loosened and dissolved by the gasoline.

Since interfacial mixing is dependent on the rate of flow, reduced contamination of product at the interface was experienced during periods of pumping at the maximum rate. During several shipments, shutdowns were necessary for repair of line breaks, and interfaces of these batches showed marked increase in product mixing and discoloration of gasoline.

Also influencing mixing at the interface was the insertion and removal of scrapers at locations not having standard sending and receiving traps. Redesigning these traps enabled scrapers then to be dispatched at the exact point of interface.

**Operating Techniques.** All the remedial measures previously taken had served to decrease the volume degraded by contamination but nearly one fourth of each batch was still being reprocessed. Continued experience proved that establishing an operating technique for the handling of batch shipment also could help eliminate contamination. Employe training and indoctrination to give everyone a full background regarding the "why and wherefore" of maintaining a clean stream made it much easier for operators to understand the special instructions concerning the handling of each batch.

A thorough check of the system indicated that manifold valves in the closed position not equipped with telltale nipples were leaking under operating pressure allowing crude oil to be mixed with gasoline at two of the pump stations. This cause of contamination was eliminated by installation of fantail blinds at the valve locations in question. Fantails were impractical, so arrangements were made later to insure that any leakage would be from gasoline to crude oil by controlling pumping pressures.

To be sure that unavoidable contamination was confined to the interface, all station piping was flushed with gasoline as the forward interface passed each station.

Initially, switching of the incoming stream at the terminal from crude-oil storage to contaminated natural gasoline storage was determined by the visual color of samples taken at the receiving scraper trap at destination. The switch from the contaminated natural tank into stock storage was made on the basis of Saybolt Color tests and the ASTM gum content of samples taken at the same point.

Later, as the size of the interface decreased, it was found that switching of the stream from crude-oil tankage into stock storage could be accomplished at the midpoint of the interface, thereby eliminating the switch into the contaminated natural tanks. The first portion of the interface received was diverted into crude-oil tanks equipped with propeller-type tank mixers and did not noticeably affect the tank contents.

### Effect on Batching on Normal Operation

**Seal Difficulties.** During the second year after beginning batch shipments of natural gasoline, pump packing was replaced with mechanical type seals and one mainline station was converted to unattended automatic operation. It was soon discovered that unless each station was bypassed during arrival of the forward interface, suspended foreign matter would cause seal failure. This bypass procedure was later incorporated into the scraper schedule to insure against seal failure. Such procedure required manning the automatic station during scraper passage.

**Sump Tanks.** At stations equipped

*Continued on Page 56*

# Pumping Progress Report

## FOR PETROLEUM ENGINEERS

An advertisement prepared by the Aldrich Pump Co., Member of Hydraulic Institute, U.S.A.

PUMPING LIQUID BUTANE AND PROPANE is a typical operational headache successfully handled by the Aldrich Pump Company Engineers. It was a particularly tough pumping problem for one large pipe line company; they had to move butane 186 miles — from a Texas oil field to a Gulf Coast refinery.

PUMPING LIGHT-GRAVITY FLUID AT HIGH PRESSURES required the positive displacing action of conventional reciprocating pumps plus the flexibility of capacity provided by centrifugals. And Aldrich Engineers knew the answer — the Aldrich-Groff Controllable Capacity "POWR-SAVR" Pump.

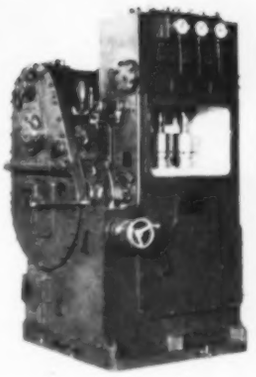
STEPLESS STRAIGHT LINE CONTROL OF CAPACITY, from zero to rated maximum output, was possible with the "POWR-SAVR". Pump delivery was automatically controlled to suit varying requirements and power consumption became nearly proportional to the rate of output, affording desirable power savings.

SURGE TANKS WERE ELIMINATED, due to the "POWR-SAVR's" ability to meet immediate changing line conditions. This eliminated associated evaporation losses, co-mingling of different batches, and much of the danger of handling highly flammable material. Gone, too, was the need for bypassing to handle excess quantities of pump output.

UPRIGHT DESIGN of the "POWR-SAVR" places discharge valves directly over the plungers and inlet valves at one side. Efficient valve action permits the pump to operate at the high rate of 240 rpm. Another design feature was the use of porcelain plungers, reducing packing and leakage troubles.

THE ALDRICH PUMP COMPANY has been solving the difficult pumping problems of American industry since 1902. We've never turned down a challenge — many of yesterday's tough pumping problems are today routine.

DATA SHEET 65A, describing the Aldrich-Groff Controllable Capacity "POWR-SAVR" Pump will be sent to you on request. Or our representative will be glad to call. Address your request to: The Aldrich Pump Company, 6 Pine Street, Allentown, Pa. (Advertisement)



Aldrich-Groff Controllable Capacity "POWR-SAVR" Pump suitable for pumping butane and other light-gravity fluids.

**...for your tough pumping problems specify ALDRICH**

This machine is ideal for pumping light-gravity fluids at medium and high pressures. It combines features of superior efficiency and positive displacing action of reciprocating pumps with the flexibility of capacity of centrifugal pumps. A unique, reliable mechanism controls the plunger-stroke from zero to rated output without change of speed of power source, providing desired savings in power plus top efficiency.

**Typical Applications for the Aldrich-Groff "POWR-SAVR" Pump:**

| | |
|---|---|
| Pipe Line Service | Process Charging |
| Boiler Feeding | Oil-burner Supply |

*Write for Data Sheet 65A, describing the features of the "POWR-SAVR" Pump. Or, if you prefer, our representative will be glad to call.*

**THE ALDRICH PUMP COMPANY**

Originators of the Direct Flow Pump

6 PINE STREET

ALLENTOWN, PA.

*Representatives in principal cities*

# Are Your Memos Effective?

**Here is a formula that will solve your memo-writing problems and help you set up an individual style for company communications.**

**By AUREN URIS,** Research Institute of America

THERE'S A SURE FIRE formula for writing effective memos.

Just one hitch: you have to work it out for yourself:

That's not to say that one of these clever writer chaps couldn't give it to you in a couple of neat paragraphs. But it just wouldn't be the same. It would be his, not yours.

### Investment With a Future

It's worth your while to make the small investment of time and effort needed to develop an answer to the memo-writing problem. The memos you write do two things for you:

- They help create the impression, either for good or bad, you make on your associates.
- Your memos are a major means of integrating you and your efforts into total company activity.

There's one point that ought to be made at the outset: memo writing is one activity where quantity doesn't necessarily mean quality. Take this case, for example:

Executive A never writes a memo to anybody about anything. Executive B's outbox is piled mountain high with correspondence aimed up and down the line.

Yet the second executive may be doing just as poor a job "putting himself across" with the receivers of his mail as the non-sender. In short, "doing it" isn't enough. It's doing it well that pays off.

### Working Out the Formula

Here are the steps that lead you down the road to better memos, the heartfelt thanks of all your correspondents, and the satisfaction of a greater mastery of an important management skill.

**1. Gather a sample of inter-office memos you've received recently.** If you like, ask your secretary to do it for you. If your correspondence is filed as it comes in, ask your secretary to accumulate the memos that come your way for the next few days. Anywhere from 6 to 20 pieces of correspondence will do the trick.

**2. Separate the bad ones from the good ones.** Go through the memos you've accumulated, dividing them into two piles. In one pile put all the memos that you feel are poorly written, those that, for one reason or another, you *don't* like, those that make difficult or dull reading. This is your "N. G." pile. Into the second pile go the "O. K." memos—those you feel do the job for which they were intended.

Disregard content at this point. You may find, for example, that in one communication, the boss has called you down. If you can admit, however grudgingly, that his memo is well-written, it still goes into the *O. K.* pile.

**3. Analyze the qualities that make for a poorly written memo.** You may find that some memos have qualities that are obviously undesirable. The quality of verbosity, for example, is easy to spot. But of course there are other possible drawbacks besides that of using a dozen words where one word will do. Keep on going through the group of memos and note on a sheet of paper each quality that you find objectionable.

One executive, after following this procedure, was able after 15 minutes of analysis, to come up with the following list of *undesirable memo characteristics.*

*No clear idea of memo purpose*—The item in which this characteristic was observed started off with a rambling discussion of the necessity for cutting costs. After six paragraphs of this, the writer then stated the memo purpose—an idea he had for improving an office procedure.

*Overload of big words and stilted phrases*—"I am of the opinion that it is highly desirable to create an early liaison between sales and production on this vital matter. Ultimate considerations should be taken up," etc., etc.

*Unattractive "hard to read" appearance*—two pages of single-space typing all in one sentence.

*No purpose, but an ulterior motive*—This quality was contained in a memo that was really only a sounding board for the writer to express his gripes and complaints.

**4. Spot the qualities that make for a well-written job.** Proceed in the same manner to go through your "O. K." pile. In some cases you may not be able to decide off the cuff ex-

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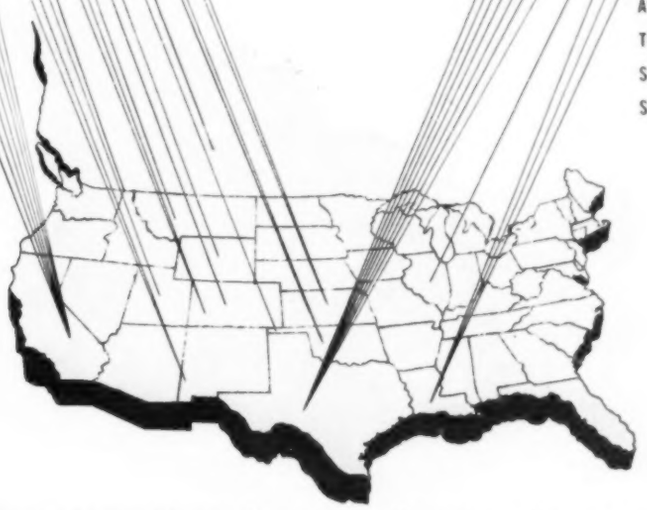

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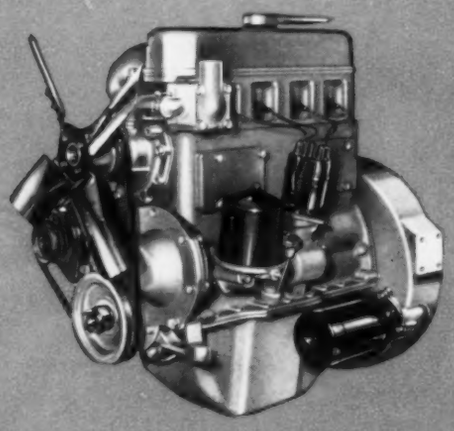

| Model | Bore Stroke | Displ. Cu. In. | Max. H.P. |
|---|---|---|---|
| G.O. 173 | 3½"x4½" | 173 | 67 @ 3200 R.P.M. |
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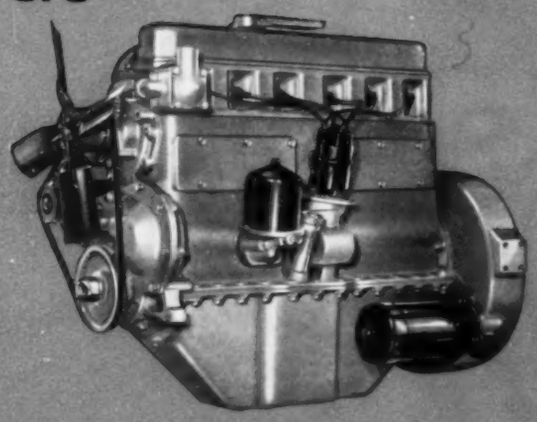
### G. O. 6



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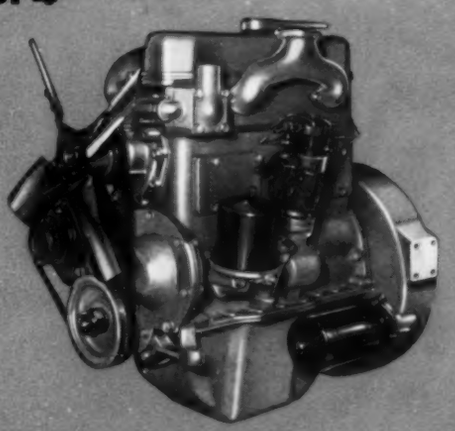

| Model | Bore Stroke | Displ. Cu. In. | Max. H.P. |
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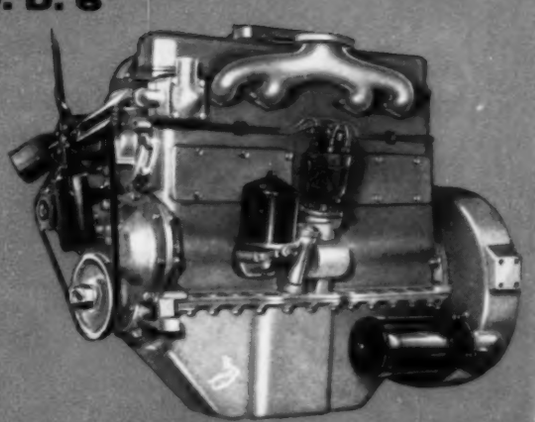

| Model | Bore Stroke | Displ. Cu. In. | Max. H.P. |
|---|---|---|---|
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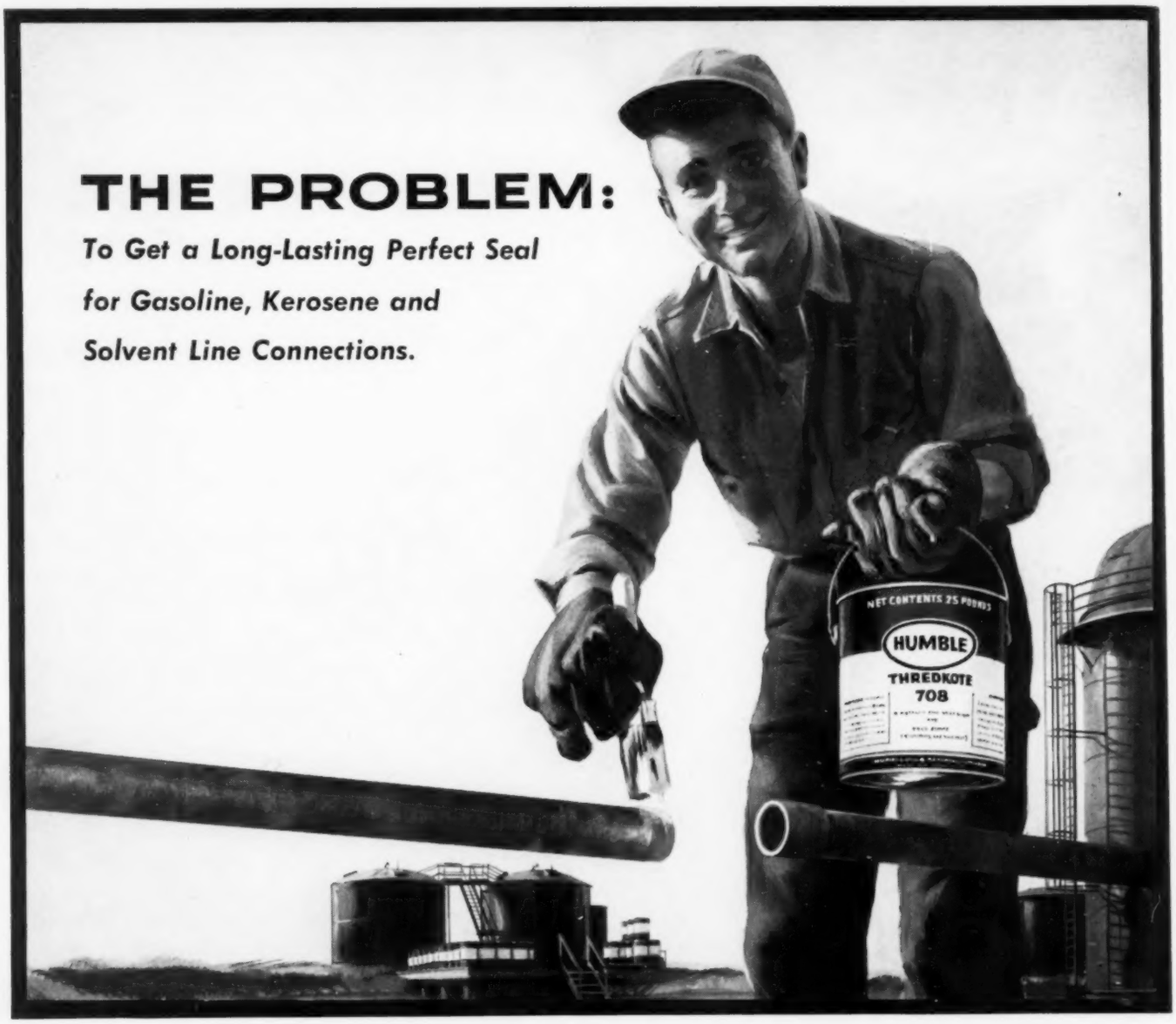


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HUMBLE

actly why you find a particular memo easy or pleasant reading. You may have to do some thinking about the individual pieces.

### Qualities of Well-Written Memo

After you've gone through your "O. K." correspondence, you may find a list of desirable qualities that looks something like this:

**Early statement of purpose**
**Clear statement of purpose**
**Persuasive**
**Businesslike, to the point**
**Easy to read**
**Well organized**

### Don't Start Writing Yet

Now that you're up to this point, you've completed more than half the job of developing your personal memo writing formula. But hold on. You've still got a little distance to go before you can switch on the dictating machine and say, "Miss Smith, take an inter-office letter."

It's the "how-to-do-it" element that's still lacking.

By compiling your list of *undesirable* memo qualities you are now aware of how *not* to write a memo.

By compiling your list of desirable memo qualities, you have a pretty good idea of the basic prerequisites. Now it's necessary to work out the implementation. You want to master the mechanisms involved in working the desirable memo characteristics into your own memo-writing style.

### Building "The Perfect Memo"

Some of the points are obvious. Now that you've indicated by your own reactions that it's desirable to have an "early statement of purpose" in an inter-office memo, there's little question as to how to accomplish this end.

But for the sake of completeness, let's go down the list item by item and work through the points involved.

**Early statement of purpose**—"Early" doesn't mean in the first sentence, but it should mean in the first paragraph. Let's say, for example, that you want to tell your superior that one of your customers is about to send in an order that will require special attention. Your first paragraph might read: "In a phone conversation with Ed Jones this morning, he told me that he's considering a re-order of our XL-50 material. He'll let us know by the end of the week, but I'd like to remind you that placement of this order will mean . . ."

**Clear statement of purpose**—This seems like a pretty obvious point, but actually it's one with which many executives have trouble. "My department has been having considerable difficulty with deliveries," one executive writes. And then he goes on with a general discussion of the transportation problems that have hampered his operation off and on over the past years. What's the "purpose" of this memo? Is the executive going to suggest holding conferences with the carriers or is his idea to change the means of transportation?

A "clear" statement of purpose means a simple and specific statement that will explain why this particular memo is being written at this particular time:

"I would like you to O. K. the extra expense involved in having a direct messenger service for small shipments from local suppliers."

**Persuasive**—Frequently you'll write a memo to get someone to go along with an idea or a course of action. Your correspondent may be anyone in or outside your organization. But the art of being persuative by means of the written word is somewhat different than the oral effect. The matter of being persuasive, of course, is a subject all by itself. In connection with written memos however, there are two points to keep in mind. You can get people to see things your way by these two means:

**a. Paint the objective you're trying to achieve in attractive terms:** "I feel this idea, if properly worked out, could be the solution to a problem that has been a headache to all of us. In your own case, for example, it would mean that you'd be rid of the nuisance of supervising six people by 'remote control' . . ."

**b. Support your statements or arguments by facts that tend to back up or prove your contention:** "A similar move was made by the ABC Company one year ago. In this twelve-month period they have achieved the following results . . ."

**Business-like to the point**—Don't confuse this quality with brevity. You could write a 1000 page report that would still be business-like and to the point. This quality can be summed up in a single word: "*relevancy*." As long as what you're saying bears on the basic purpose of the memo, you're on the beam.

**Easy to read**—This quality can be built into a memo in several different ways. There's no hard and fast rule, but here are some of the points to keep in mind:

**a. Interest**—Material can be either inherently stimulating or dull as dishwater. If you're describing how something happened, for example, you're in effect telling a story that in the average case will be able to sustain your reader's interest. You're in a less fortunate position, however, if what you're writing about centers on a mass of monotonous data.

**b. Brevity**—Generally short words make easier reading than long ones. Ditto short sentences. Ditto short paragraphs.

**c. Well-organized**—Frequently you can spot this quality at a glance. You examine one memo, and it looks like a solid block of typing. You approach the task of reading it with the same resignation as the explorer, machete in hand, confronting a dense jungle.

The well-organized memo, on the other hand, is as attractive as an open sunny field. And as a matter of fact, in the way a well-organized memo is laid out—in its precision and neatness—it has some of the qualities of neatly fenced-in countryside. Here are the specific points that make for good organization:

*Title*—Even if your inter-office form doesn't have the printed word "subject" at the top, there's no reason for you not to add it. Here are a couple of examples:

*Subject:* Vacation Schedules for the Maintenance Department.

*Subject:* Suggested Agenda for St. Louis Meeting.

*Main headings*—The average memo lends itself to division into two or more main sections. Here, for example, are the main headings used in a memo discussing a grievance case: Background; The Grievance Incident; Developments in the Handling of the Case; Present Situation.

Incidentally, in this connection, the lives of many executives have been made a lot easier by their secretaries. Your secretary may very well be able to make constructive suggestions as to

**Good Old Days?** Portable pickup pump, 1927, shown in operation on a leak. It could pump about 80 barrels an hour. Today's portable pumps can pump 800 barrels an hour, 10 times as much. The unit has iron wheels. No one thought of putting pneumatic tires on them until much later.

the positioning of headings and subheads.

### Using the Formula

There you have it—your personal formula for effective memo-writing. The basic approach, of course, has been to get you to analyze what it is about the memos you *receive* that you find particularly desirable, and to incorporate these qualities into your own memo style. It's simply an application of the golden rule—you'll be doing unto others what you'd like them to do for you.

### Testing Your Effectiveness

The question of *content* comes up in connection with the memos you write. The checklist below can help you analyze your memo writing performance on this point:

1. Do your people often have to check you for—
   a. additional information (for example, to supplement a report)?
   b. clarification of a communication you've sent them?
2. Do your subordinates complain that they get information late?
3. In communicating with your superior—
   a. do your replies to his reports or memos tend to be late?
   b. do you have to call him on the phone to give him additional information that should have been included in the memo?
   c. does he have to contact you for an explanation of your memos?
4. In your communications with fellow executives—
   a. are you handicapped by persistent gaps in information?
   b. are you sending any routine memos that no longer fill a purpose?
   c. do you know of any change in method of communications that would improve results (e.g., switching from memos to conferences)?

Finally, keep in mind that you have available to you a gold-mine of information about your memo-writing practices. Just check through the carbons on the last ten memos you wrote. How do they stack up against the list of "desirable characteristics" you developed by examining the other fellow's correspondence? —**The End**

## How to Batch Gasoline

*Continued from Page 48*

with float control switches on sump tanks, it was necessary to switch to manual operation while pumping gasoline to be sure that the sump wasn't pumped into the gasoline stream.

**Control Equipment.** Since all stations used centrifugal pumps, operating pressures while pumping gasoline were less than those encountered with crude oil. This required resetting station pressure control equipment before and after each batch shipment.

**Safety and Communications.** Because of the greater hazard of operations while handling gasoline, extra alertness on the part of all personnel was required. Full period wire communications were essential for coordinating system operations and making checks of hourly pumpings and receipts. Extreme care was necessary during line repairs after gasoline leaks.

**Sampling.** Line sampling at stations and at the terminal was much more critical during batch movements than during periods of pumping straight crude oil because of the necessity for accurate timing and product grading.

**Results of Efforts.** After 3 years of work on methods and techniques, batch shipments were being made in which 95 to 97 percent of the total volume received was clean and on specifications without further processing.

This not only meant that costly reprocessing had been virtually eliminated but that terminal tankage formerly set aside for the storage of contaminated natural gasoline could be used as working storage for different grades of crude oil.

**Conclusion.** By combining the practices outlined to achieve minimum contamination and the maximum percentage of clean product received, the batching of natural gasoline through crude-oil pipe line systems is technically feasible and offers economical advantages to the shipper. When line capacity is available it also can be a source of potential revenue for the carrier.

ACKNOWLEDGMENT

Acknowledgment is made to Phillips Pipe Line Company, Crude Oil Transportation Division, Bartlesville, for its cooperation in supplying the data for this paper which was presented at the ASME Petroleum Mechanical Engineering conference in New Orleans, September 25-28, 1955.

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- Mid-Continent Pipe Line Co.
- Natural Gas Pipeline Co. of America
- Phillips Petroleum Co.
- Seaboard Oil Co.
- Service Pipe Line Co.
- Standard Oil Co. (Ind.)
- Stanolind Oil & Gas Co.
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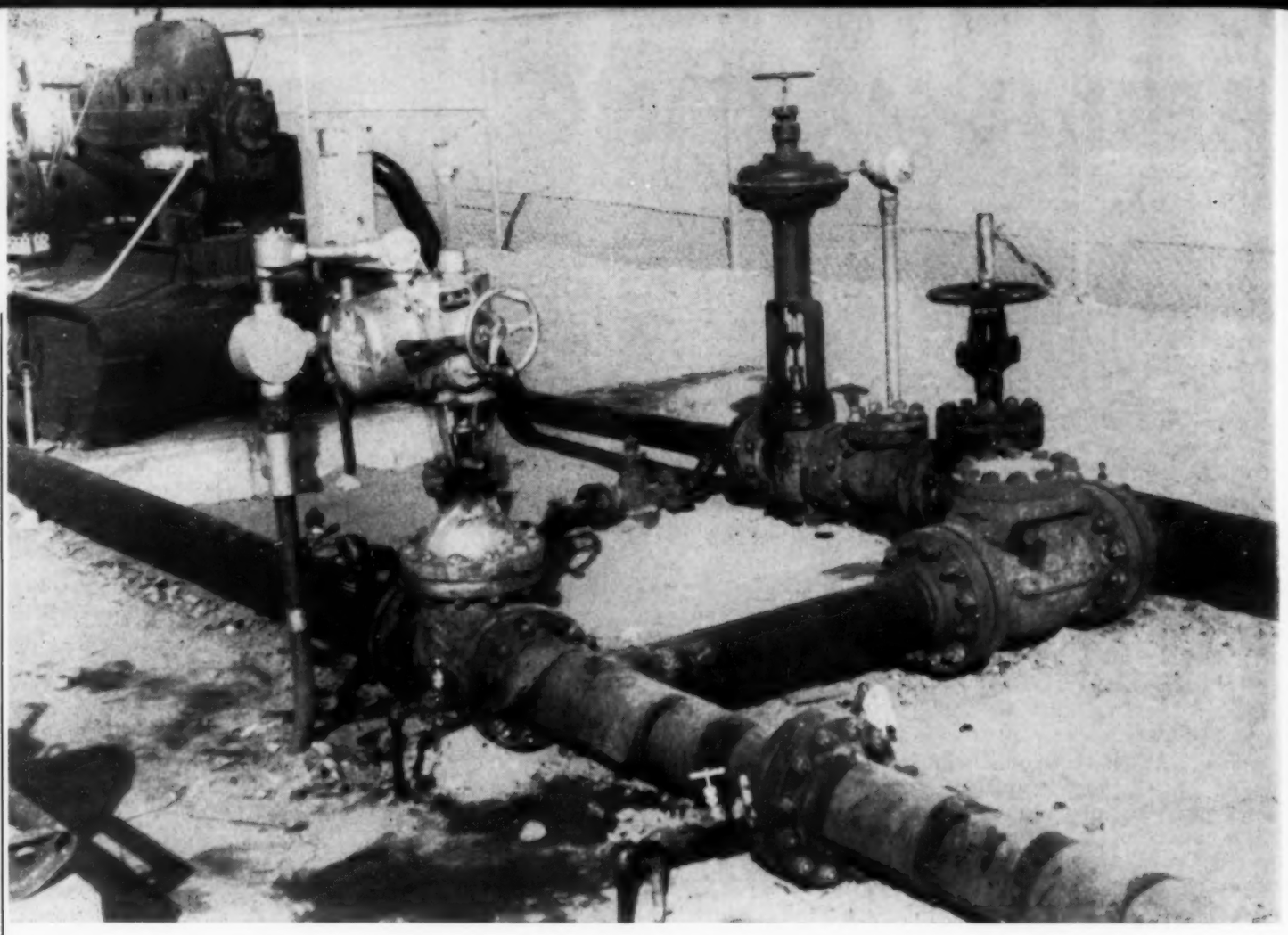

FIGURE 1—Typical piping arrangement for a single pumping unit used as a relay booster station on a closed pipe line system.

# Control for Minimum Load Starting For Closed System Pumping Units

## Pneumatic and electrical control systems are integrated.

By **MAX T. NIGH,** Service Pipe Line Company, Tulsa

THE CONTROL method used for minimum load starting of closed system pumping units is an integration of pneumatic and electric control systems. Its purpose is to permit minimum load starting of an electric centrifugal pumping unit. The control method is most applicable to these units when used as booster stations in a closed pipe line system. It has been applied successfully to pumping units ranging from 300- to 1250-horsepower.

Combination of these two control systems is not unusually involved and results in the following benefits:

1. Economy in station investment and maintenance.
2. Reduced starting torque requirements on motors.
3. Problem of voltage dips during starting period of machinery minimized.

To look at these benefits more closely, beginning with economy in station design: In Figure 1 is shown a typical piping arrangement for a single pumping unit employed as a relay booster station on a closed pipe line system. The particular unit shown is on an 8-inch line. The unit is unattended and remotely controlled by means of supervisory control over existing telephone lines.

It will be noted that there is only one motorized gate valve to isolate the station automatically, and it is located

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in the suction line. The motorized gate valve normally used in the discharge line has been replaced with a check valve. This design provides adequate means for isolating the pumping unit from the line when operating the machinery unattended. When maintenance work is required on the equipment, the manual isolating gates can be used.

In connection with torque requirements of the motor, for any given pump, torque curves shown in Figure 2 may be used to illustrate the principles involved. As shown, the motor torque curve, at full voltage, is well above the pump torque curve during starting. This is true whether the pump is started against an open or closed discharge valve. This is in accordance with good engineering practice.

However, note the motor torque starting curve for a voltage of 80 percent of normal line voltage. In this case the torque curve for the motor falls below the pump torque curve when the motor speed reaches 2600 rpm. This means that the motor will not reach a speed where the pull in torque can be used to bring the unit up to operating speed. Machinery located on the end of long power lines particularly is subject to this reduction in line voltage during starting. Pipe line machinery located in highly industrialized areas, where the load on the power lines is high, is often faced with line voltage dips during starting.

Results of a pumping unit starting under reduced voltage and not being able to reach full speed is that the motor will draw high current, stall and overheat. The overload relays, which are set for a certain time delay at that high current level, ultimately will take the unit off the line. This obviously is not good for the machinery even though the best available protective devices are used to protect it.

The usual solution to the problem is to start the pumping unit with the centrifugal pump discharge valve closed. A motorized gate valve could be used to accomplish this; however it is not designed to throttle fluid flow and complications arise when used in this manner. Another problem also is created when the valve is opened after the pump is up to speed. The large pressure differential across the gate valve discs presses the discs against one surface. The motor operator on the gate valve may not be able to break the discs loose and the motor operator starter will drop out due to being overloaded.

This large differential can be avoided by starting to open the valve before starting the pumping unit. Here another problem arises, however, in that the gate valve opens so rapidly, in terms of area exposed to flow, that extended throttling action is not possible. An excessively high demand could be established in cases where line is not already packed due to very high flow rates for the minimum de-

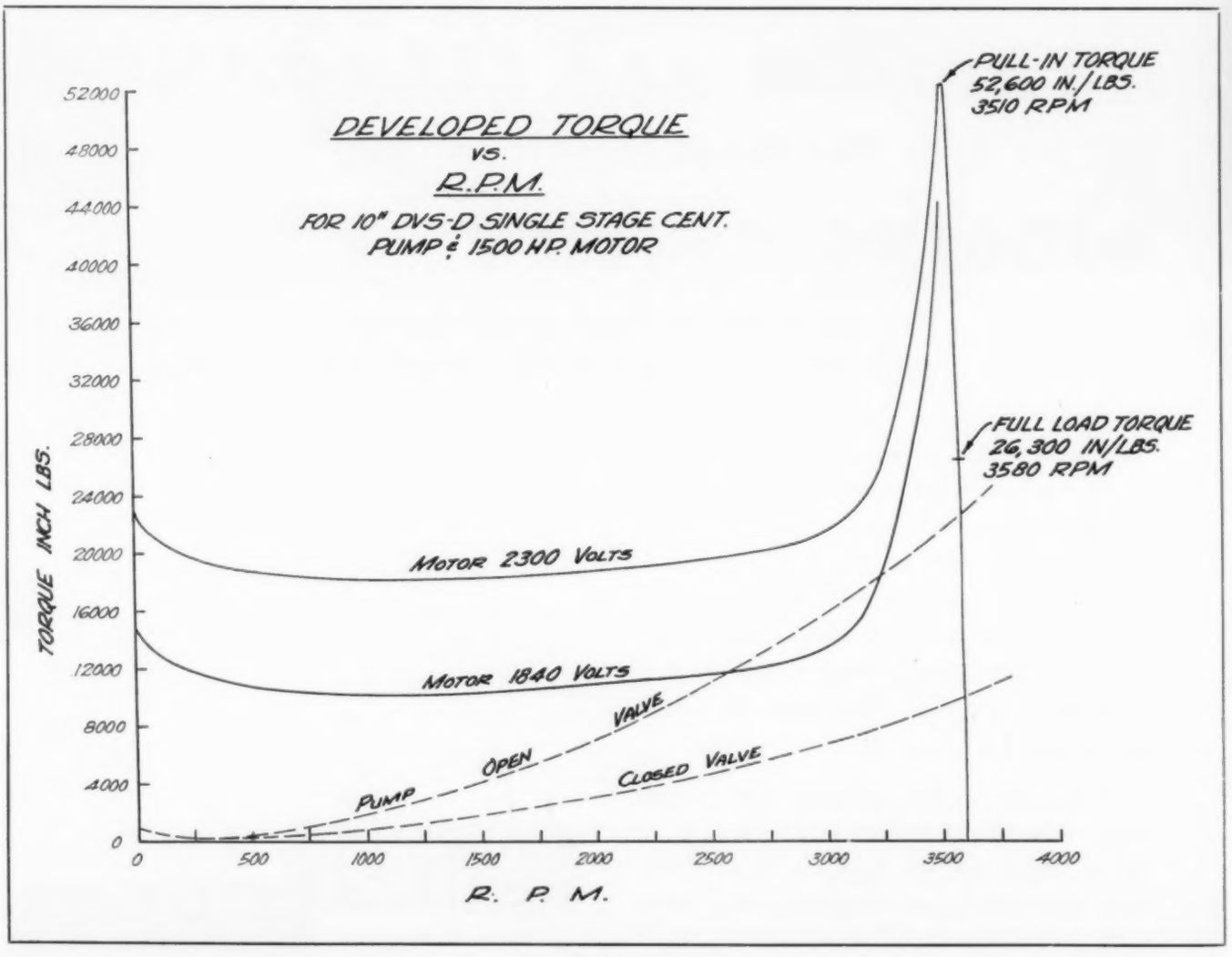


FIGURE 2

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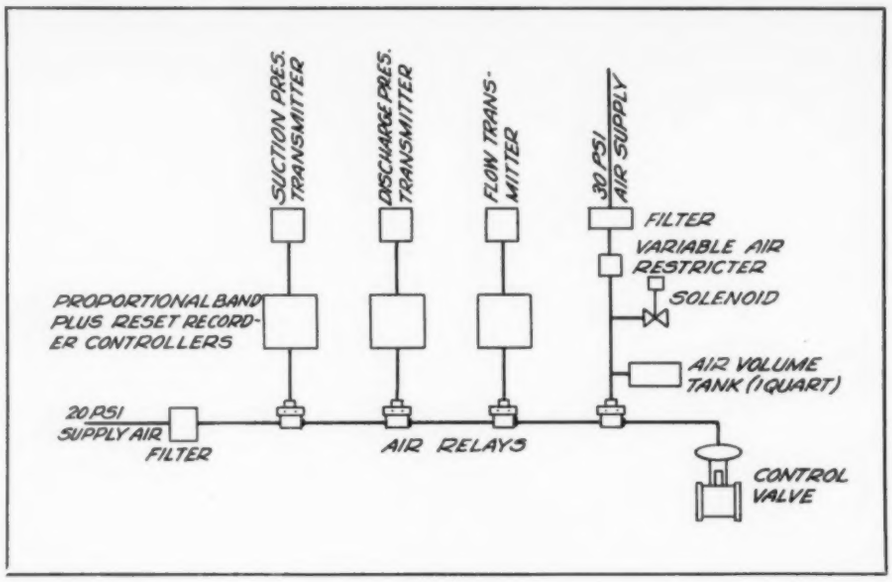


FIGURE 3

A completely closed control valve also is to be avoided on an unattended relay pumping unit where the low suction pressure shutdown is being depended on take the pumping unit off the line automatically. With the pumping unit located in a valley the following conditions could easily exist.

Assume the suction controller set at 50 psi and the suction pressure shutdown set at 25 psi. With the control valve permitted to close fully when throttling to maintain 50 psi suction pressure, at no flow conditions in the line, the hill pressure would prevent the suction pressure from ever dropping below 50 psi. Thus, the pumping unit would not shutdown due to low suction pressure. The low flow rate through the pump would create a high oil temperature in the pump case. The unit would shutdown ultimately by activation of the hot oil protective device provided the device was located where it would detect change in temperature of the metal parts of the pump before they had expanded to the point where they would freeze.

mand period. This high rate of flow, after starting, also may pull the suction pressure down faster than the control system is capable of reacting to it, and the unit will shut down because of low suction pressure. Thus, restarting the unit will be required, creating unnecessary surges and complicating operations at upstream and downstream stations.

The control valve has been designed as a throttling valve and is expected to throttle fluid flow at high or low pressure differentials. It thereby overcomes the problems created when using a gate valve for such service. In the control method suggested here, the control valve is allowed to close before the unit starts and is allowed to open very gradually after the unit is up to speed. This permits the pumping unit to be started against an essentially closed discharge valve, and thus avoids possible overloading of the unit during starting.

By opening the control valve very gradually, after the pumping unit is up to speed, the pump flow rate is very much reduced, thus packing of the pipe line takes place gradually. With the flow rate allowed to increase gradually, upstream and downstream station operation is simplified.

Another advantage to closing the control valve before starting is that this stroking will free up the valve permitting more reliable response to a change in control signal. It also places it much closer to the position required for control purposes should suction or discharge pressure set points be exceeded. By taking less time to reach the desired throttle position, much more stable settings of proportional band and reset can be made on the controllers. Thus the controllers will be set in accordance with rates of change in flow and pressure encountered during normal operation, rather than be set to react to the usually fast and local changes in flow and pressure which take place during the starting of a unit.

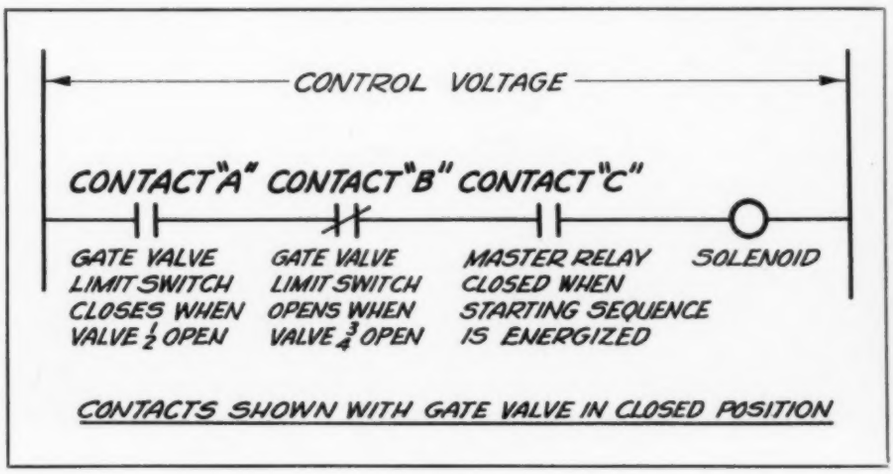
CONTROL VOLTAGE
CONTACT "A"
CONTACT "B"
CONTACT "C"
GATE VALVE LIMIT SWITCH CLOSES WHEN VALVE 1/2 OPEN
GATE VALVE LIMIT SWITCH OPENS WHEN VALVE 3/4 OPEN
MASTER RELAY CLOSED WHEN STARTING SEQUENCE IS ENERGIZED
SOLENOID
CONTACTS SHOWN WITH GATE VALVE IN CLOSED POSITION

FIGURE 4

The control valve should not be allowed to close completely during the starting period. It is left cracked slightly to permit a certain rate of flow to take place through the pump, thus avoiding any build-up of the case temperature in the pump. This is accomplished by placing a mechanical stop on the stem of the control valve so that it cannot reach the fully closed position. Normally this is about one-sixteenth to one-eighth of an inch from the valve seat.

The discharge gate valve when not used for any throttling service during starting becomes only a means of isolating the pumping unit from the line. This service can be as easily duplicated with a check valve as with a gate valve, at least for automatic operation of the equipment.

With a general explanation of the logic in using the equipment for the purpose described, details of its accomplishment can be considered. In Figure 3 is shown a typical diagram of a penumatic or electronic control and measuring system which could be used for an unattended pipe line booster

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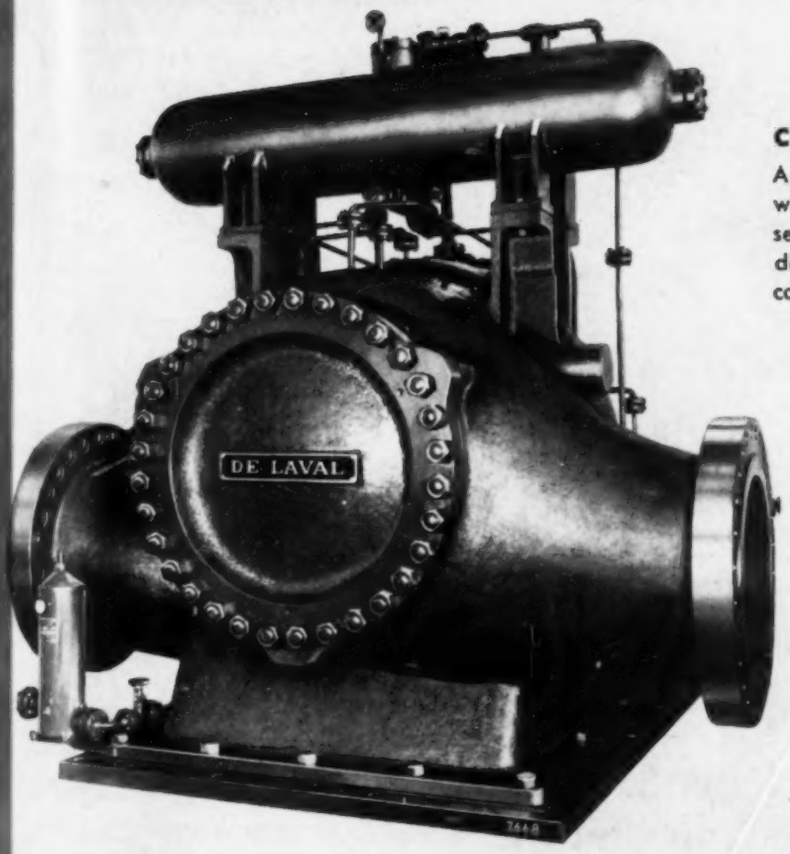


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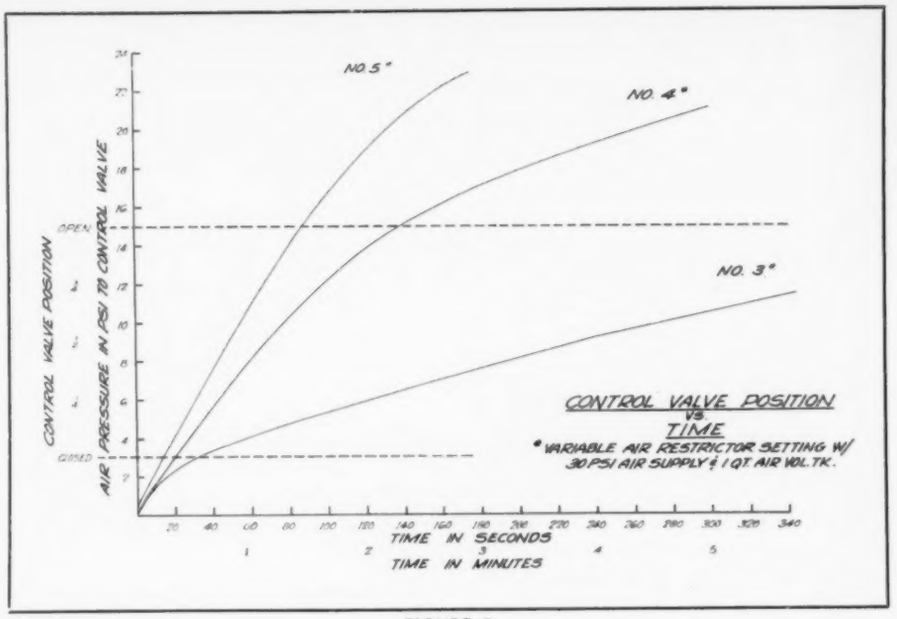



FIGURE 5

station, either automatic or remotely controlled.

Four control units are shown. The flow controller is not required for every installation, but is shown since it is often used to advantage to limit the load which can be placed upon the machinery at any time. This is to prevent establishing excessive demand that would unnecessarily increase the cost of operating the station. The fourth control unit consists of a two-way solenoid, a variable air restrictor, an air volume chamber (one quart), an air volume booster or air relay and attendant piping. The controller which has the lowest air output limits the air signal to the control valve. With an air-to-open valve (the type most often used in pipe line station design) the valve position or amount of throttling taking place through it is determined by the minimum control signal.

The solenoid control unit operates from limit switch contacts in the suction valve motor operator. The electrical single line diagram is shown in Figure 4. A limit switch within the motorized valve operator is used to start the station motor. This coordinates the timing of the two controls. A program timer could be used for the same result; however, the existing spare limit switches in the valve operator are used in interest of simplicity and cost.

Sequence of events during starting is as follows: A pressure switch on the pipe line or remotely controlled switch is closed at the unattended station, which energizes the suction valve motor operator. When the suction valve has reached one-half of its travel, contact A closes and the air solenoid is energized. This removes the air pressure from the top of the air relay, exhausting the air from the control valve diaphragm which causes the control valve to close against its mechanical stop. The suction valve continues to open, and when it reaches the three-fourths open position, the pumping unit motor starter is energized. Contact B is then opened which de-energizes the air solenoid. The pumping unit comes up to speed in about ten seconds and after reaching full speed is still pumping against an almost closed control valve.

Simultaneously with the starting of the pumping unit, the air solenoid closes. The air supply passing through the variable air restrictor builds up the air pressure in the air volume chamber and the air pressure on the diaphragm of the air relay. Thus, the control valve is opened gradually. The rate at which the valve opens is determined by rate of increase in air pressure in the air volume chamber. Different rates may be obtained by the adjustment of the variable air restrictor. The setting used is the one which matches the hydraulics of the pipe line and the machinery on the closed pipe line system. In Figure 5 is shown a series of curves for different settings on a commercially available variable restrictor of the bourdon tube type using a one quart accumulator.

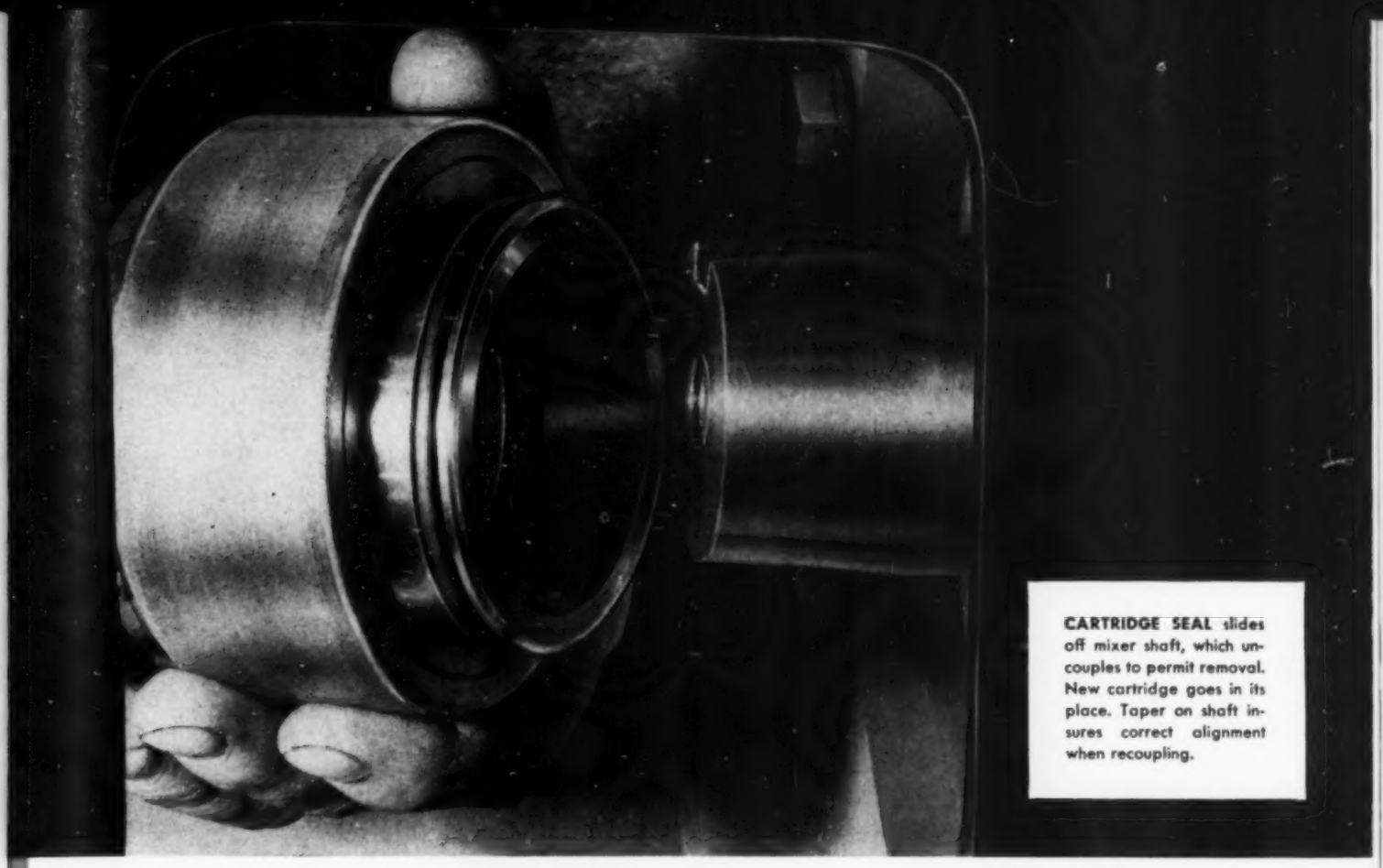
Contact C, in Figure 4, is used to eliminate actuation of the control device when the suction gate valve closes, caused by the pumping unit shutting down. This contact is taken off a master relay which closes when the starting circuit is energized and opens when the pumping unit shuts down. In this way the control valve is stroked each time the unit comes on the line. This assures reliable operation and rapid response from the control valve when needed.

An extension of this control method to multiple pumping units, connected in series, at one booster station seems entirely practical, but no installation has been made to any certain knowledge. Pre-set air regulators, with appropriate electrical interlocks, could be used, which would limit the amount of closing of the control valve each time an additional unit is placed on the line. These settings would have to be determined experimentally so that the control valve would close enough to restrict flow rate through the second unit sufficiently when starting, and yet would allow existing flow through the first to continue without too much restriction. This suggested system is for future evaluation.

—**The End**

## About the Author

MAX T. NIGH was graduated from the University of Nebraska in 1945 with a B.S. degree in chemical engineering. Prior to joining Service Pipe Line Company, where he is now an engineer in the Electrical section of the Engineering department, he was with California Research Corporation as process development engineer in the Petroleum Chemicals division. During the past five years with Service, he has worked in various phases of engineering pipe line design. Presently his activities are concerned with supervisory control, telemetering and pipe line instrumentation.



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**56 miles in 6 weeks** is the record of Irby Construction Company's fleet of TD-14's with International-Superior Booms on the job shown—taking up a 12¾-inch pipeline near Shreveport, Louisiana. Ample steady lifting power, plus all-gear drive on boom helped speed the job. Removal was handled by TD-14 boom-lifting pipe while another TD-14 pulled set of rollers below it. Ground was broken by a third International TD-14 working ahead. Pipe later was broken up and sold for scrap iron.

**Fast pipe-cleaner**—For cleaning pip**Welds 5**
before being cut for salvage, Irby Constr**on T**
Co. uses this International-powered**ine, Sen**
cleaner. Put between two TD-14**Virginia,**
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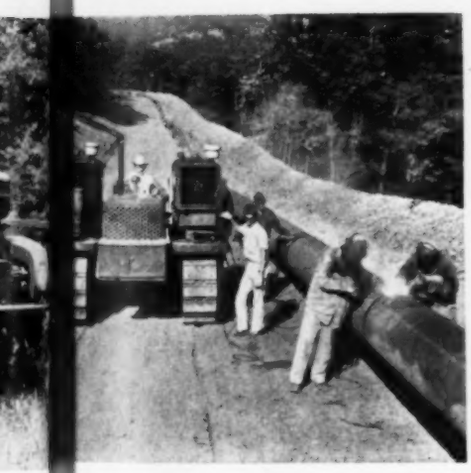
cleans pipe as tractors go down lin**2,500 fe**

**16,500 ft. per day**—This TD-14**h**
is helping lay 150 miles of 6, 8, and
10-inch natural gas line from Phenix
City to Dothan to Enterprise, Alabama. Pipelayers, Engineering Construction Co. of Tulsa, with two spreads of International-Superior Pipe-Booms and other tractors, averages 16,500 ft. per 9-hour shift.



**Welds 55 mi. gas line**—Two 40-volt welders on TD-14 provide power for stringing line, Seneca, West Virginia, to Woodstock, Virginia. Pipeline Construction & Drilling Company, Camp Hill, Pennsylvania, weld 2,500 feet daily with this rig.

**Clears 50-ft. right-of-way**—Clearing on same job described left is being done by TD-24 shown, plus 2 TD-18's and 2 TD-9's. Despite rough, rocky, mountainous terrain and 4500-ft. altitude, fleet clears an average of ½ mile per day.

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Engineering Design

### —25—How to estimate the time required to get a good shut-in test on gas transmission lines and approximate a maximum acceptable pressure loss for new lines.

**These two rules may prove helpful for air or gas testing of gas transmission lines. They are not applicable for hydrostatic tests.** Values of the constants used by different transmission companies may vary with economic considerations, line conditions and throughputs.

**To determine the minimum time required to achieve a good shut-in test after the line has been charged and becomes stabilized, use the following formula:**

$$H_m = \frac{3 \times D^2 \times L}{P_1}$$

where,

$H_m$ = Minimum time necessary to achieve an accurate test in hours
$D$ = Internal diameter of pipe in inches
$L$ = Length of section under test in miles
$P_1$ = Initial test pressure in pounds per square inch gage

**Example:** How long should a 14-mile section of 26-inch (25.375-inch ID) pipe line be shut in under a 1050 psi test pressure to get a good test?

$$H_m = \frac{3 \times (25.375)^2 \times 14}{1050} = 25.75 \text{ hours or } 25 \text{ hours and } 45 \text{ minutes}$$

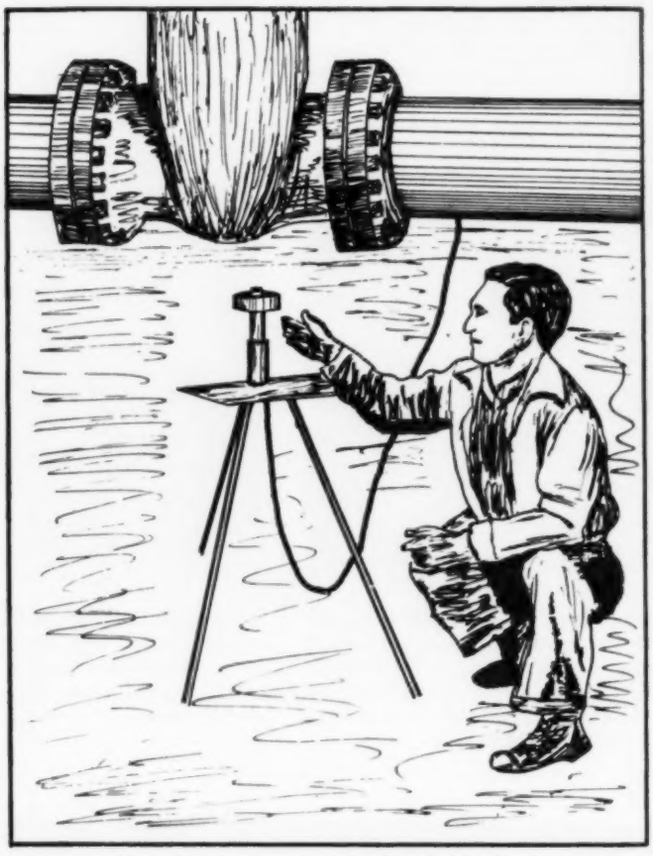
When a new line is being shut in for a test of this duration or longer, the following formula may be used to evaluate whether or not the line is "tight":

$$P_{ad} = \frac{H_t \times P_1}{D \times 949}$$

where,

$P_{ad}$ = Acceptable pressure drop in pounds per square inch gage
$H_t$ = Shut-in test time in hours
$D$ = Internal diameter of pipe in inches
$P_1$ = Initial test pressure in pounds per square inch gage

**Example**: What would be the maximum acceptable pressure drop for a new gas transmission line under air or gas test when a 44-mile section of 30-inch (29.250-inch ID) pipe line has been shut in for 100 hours at an initial pressure of 1100 psig?

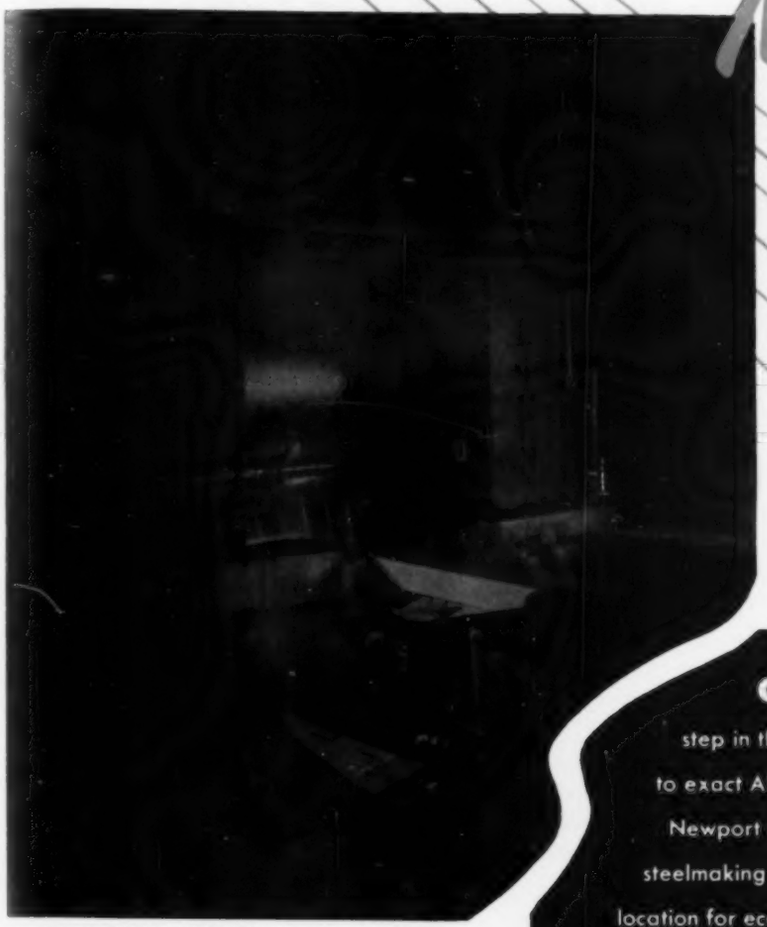


$$P_{ad} = \frac{100 \times 1100}{29.250 \times 949} = 4 \text{ pounds per square inch}$$

If the observed pressure drop after stabilization is less than 4 psig, the section of line would be considered "tight."

**Note:** Corrections must be made for the effect of temperature variations upon pressure during the test.

## ROLLING STEEL FOR LINE PIPE*...AT Newport Steel



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| | .188" | 8.64 |
| | .219" | 10.00 |
| | .237" | 10.79 |
| 6⅝ | .134" | 9.29 |
| | .156" | 10.78 |
| | .188" | 12.89 |
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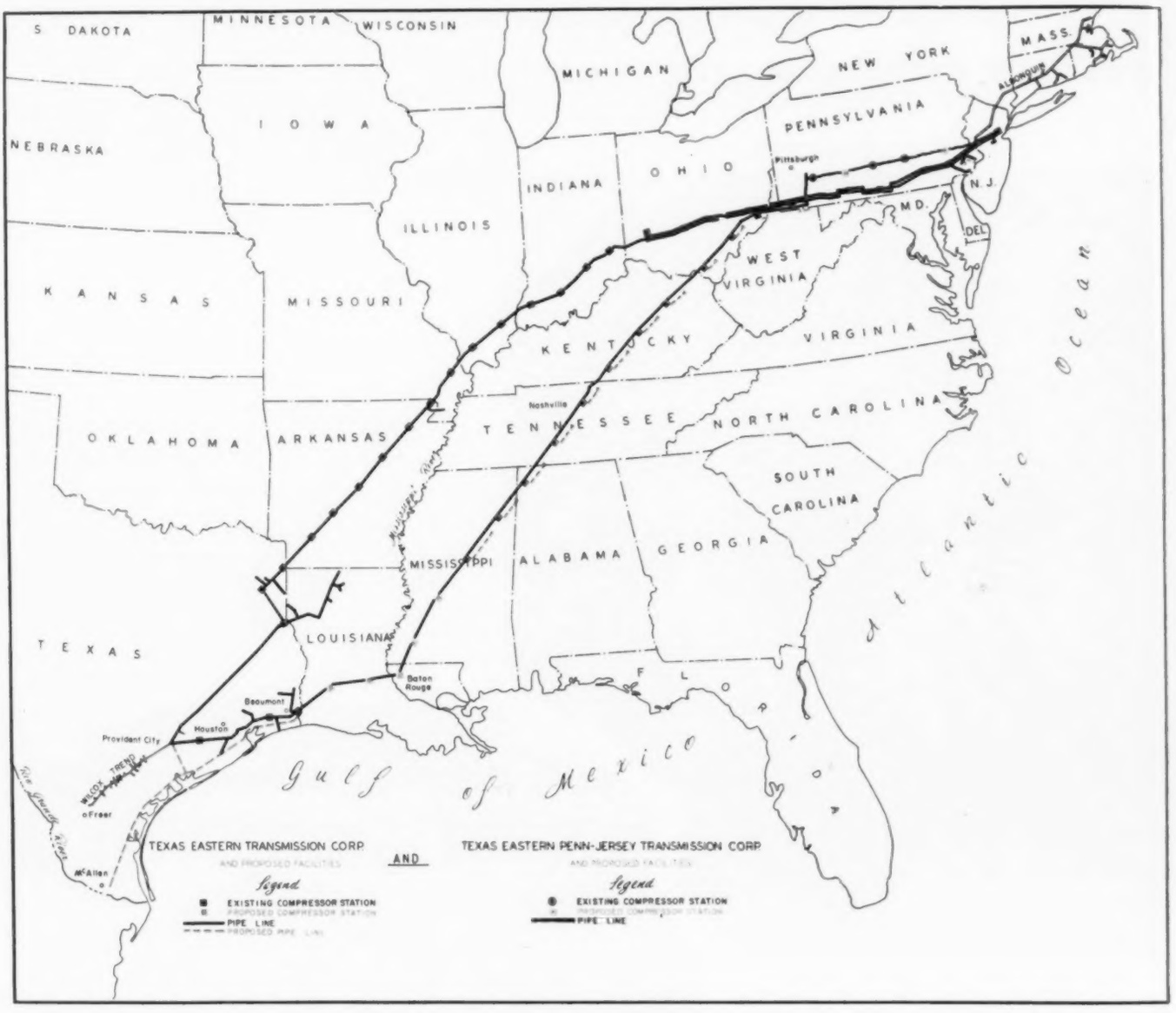


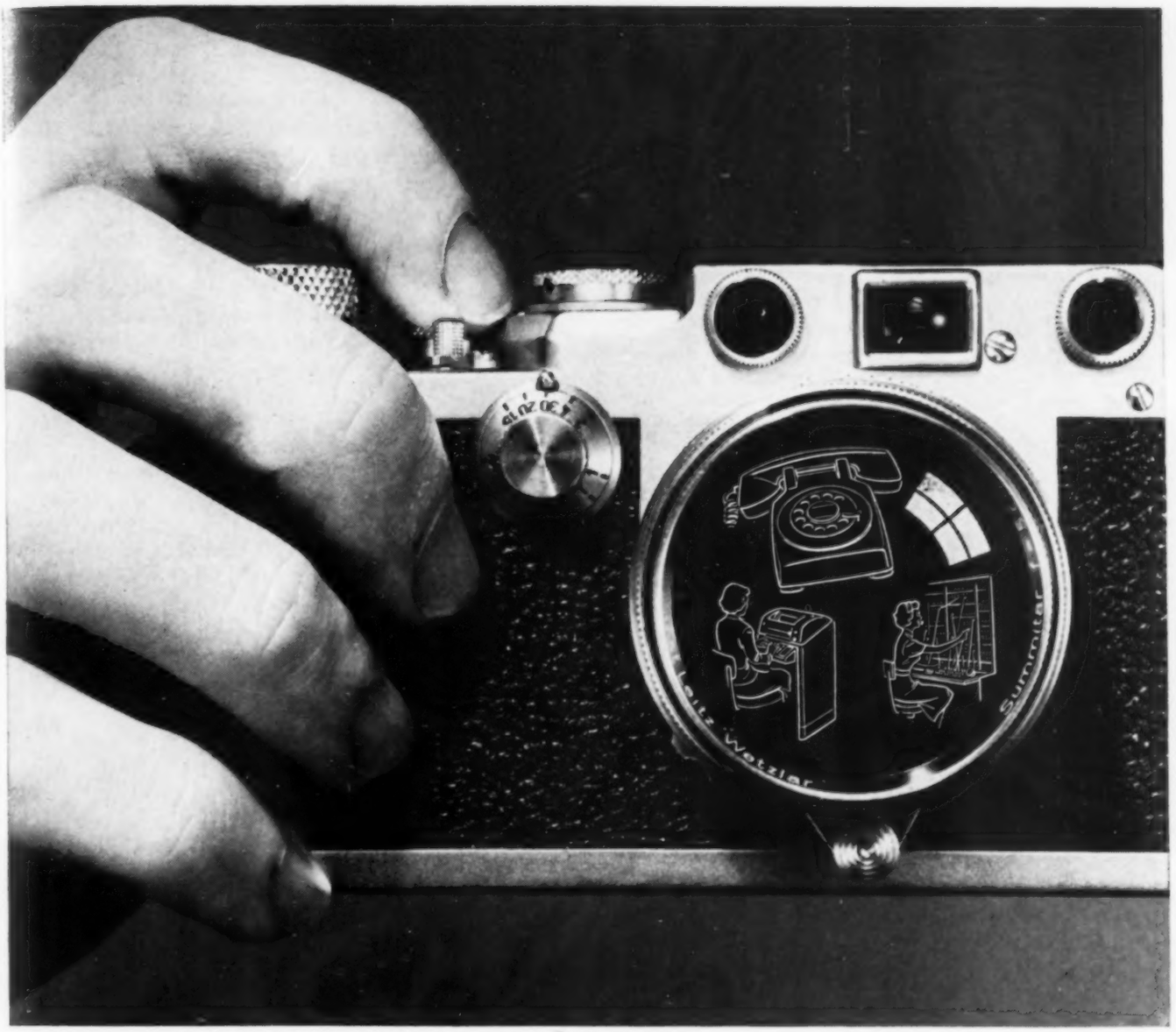

## Texas Eastern Proposes $150 Million Expansion Project

Texas Eastern Transmission Corporation has requested authorization from the Federal Power Commission to build a new 30-inch pipe line from the vicinity of Beaumont, Texas, to the vicinity of McAllen, Texas, on the Mexican border, and for the expansion of the existing 30-inch system from Beaumont to New Jersey by addition of compressor horsepower and loop lines as necessary. The estimated cost of the project is approximately $150 million.

The proposed facilities will provide the company with additional supply facilities and increased system capacity to provide for the sale, principally to existing customers, of approximately 250 million cubic feet of additional gas per day. The additional 22 million cubic feet proposed will be used to supply anticipated future demands of both existing and prospective customers.

Texas Eastern recently negotiated a contract with Petroleos Mexicanos under the terms of which Texas Eastern can purchase and receive at the international border between Mexico and the U. S. up to 200 million cubic feet of gas per day.

"This contract, together with other substantial reserves dedicated to Texas Eastern and evidenced by gas contracts filed with the application, provide ample basis for the construction of the proposed facilities and the transportation of the stated quantities of gas to supply market demands,"

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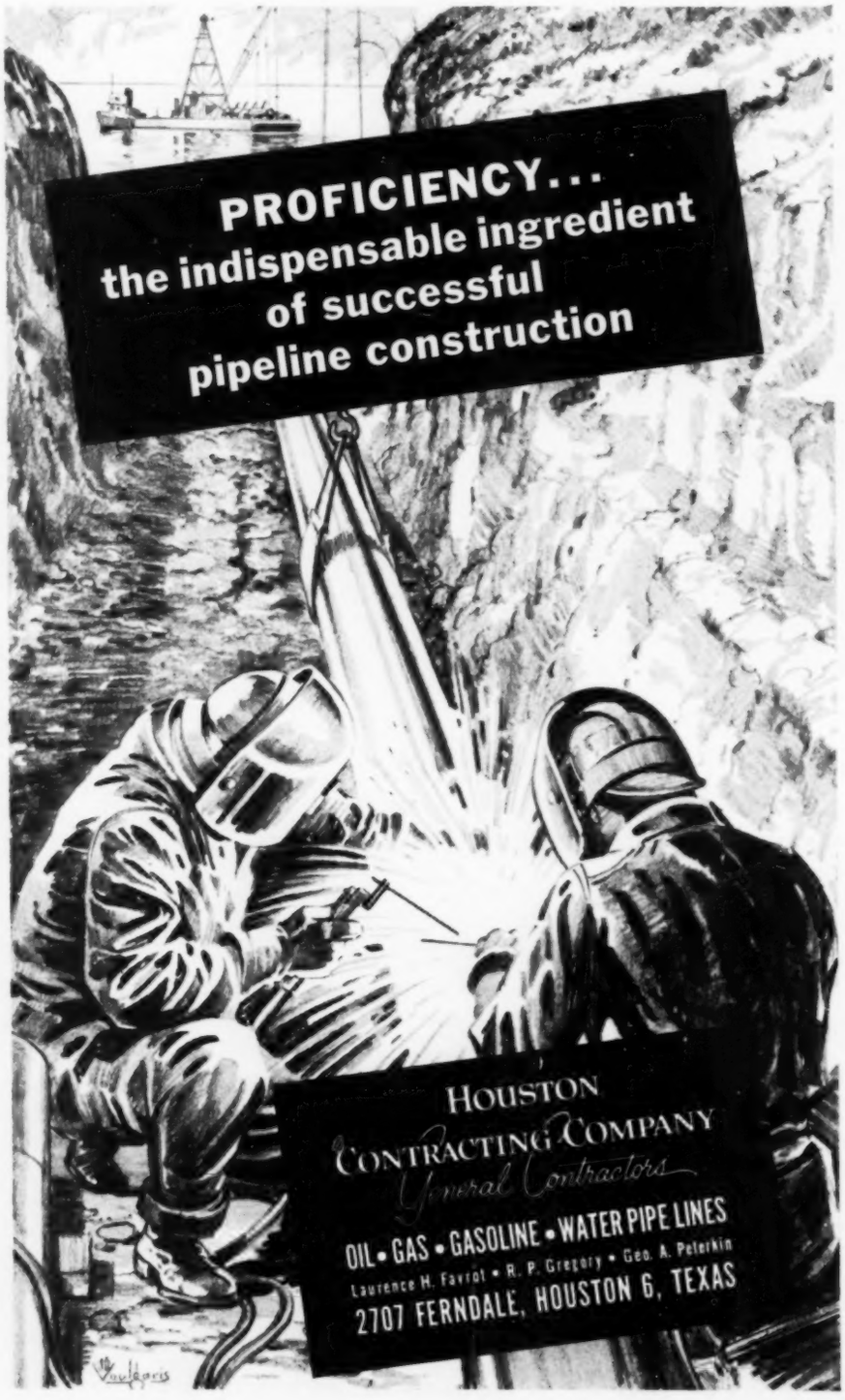
George T. Naff, president, stated.

The proposed facilities include approximately 422 miles of 30-inch pipe line from the Rio Grande near McAllen, Texas, to Texas Eastern's Vidor, Texas, compressor station; 530 miles of 30-inch loop lines along the company's existing pipe line between Kosciusko, Miss., and Uniontown, Penn.; 45 miles of 24-inch from a point of connection with the company's facilities near Provident City, Texas, to a connection with the proposed 30-inch line in Matagorda County, Texas; approximately 135 miles of supply and sales laterals; five new compressor stations totaling 50,000 horsepower; additions to existing compressor stations on Texas Eastern's present 30-inch line amounting to 20,780 horsepower; and such metering and regulating stations as are required. The expansion of facilities in Pennsylvania will be accomplished in part through the company's wholly-owned subsidiary Texas Eastern-Penn Jersey Transmission Corporation.




## Tidelands Pipe Line Regulations Issued

Clarence A. Davis, Undersecretary of the Interior, has announced regulations to govern rights-of-way for pipe lines to transport oil and gas across submerged lands of the outer continental shelf.

Rights-of-way for pipe lines will be limited to 200 feet in width for pipe lines and to the area reasonably necessary for pumping stations. Gathering lines and associated structures are not covered.

Application in writing must be accompanied by a $10 filing fee and a map showing a survey of the center line of the route sought, as well as the extent to which it will cross other leased areas. The regulations also require specification of the diameter of the proposed pipe line, compliance with regulations for conservation, payment of damages and acceptance of liability arising from use.

## Transco to Increase Facilities in Louisiana

Transcontinental Gas Pipe Line Corporation has received FPC authorization to construct pipe line facilities enabling the firm to receive and transport an additional 29 million cubic feet of natural gas per day, to be purchased from several independent producers.

Transcontinental will build 24 miles of pipe line estimated to cost $754,000. The gas will come from the South Bayou Mallet, Maxie and Happytown fields in Louisiana.

Producers granted certificates to make sales to Transcontinental are Anthony J. Tamborello, et al, Ted Weiner, et al, Phillips Petroleum Company, Shell Oil Company, and Hassie Hunt Trust. E. A. Courtney will construct ten miles of pipe and three other producers, The Texas Company, R. R. Frankel and Shell Oil, were authorized to sell gas to Courtney.

## Continental Crude Line To Colorado Completed

Continental Pipe Line Company's crude line from Guernsey, Wyo., to Denver is expected to be completed January 1. The expansion project increases the capacity of the line to 50,000 barrels daily into Cheyenne,

# Tuffy® SLING NEWS

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# NEW FERRULE EYE SPLICE FEATURED

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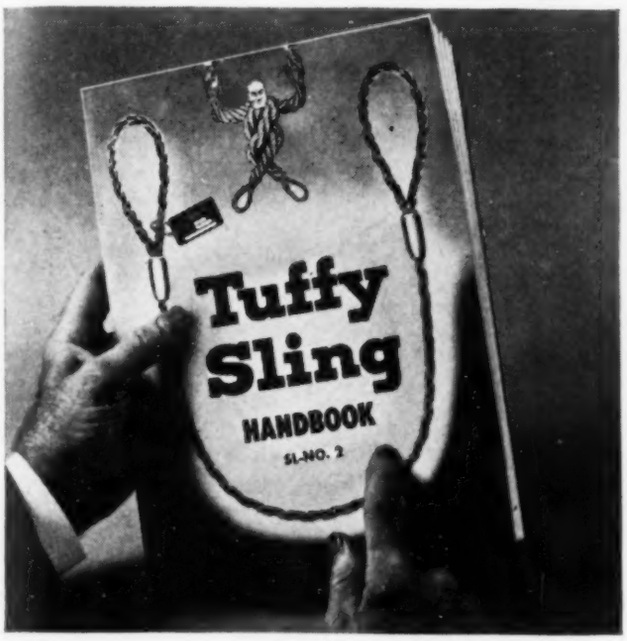


First editions of this handbook were so popular that 85,000 copies circulated to sling users. If you use or buy slings—if you're a plant engineer, safety engineer or purchasing agent—you'll find this new, enlarged edition of the Tuffy Sling Handbook the most comprehensive ever published.

It tells you all about the new factory-fitted slings added to the Tuffy line. It shows why the new Tuffy pressed-on ferrule makes Tuffy slings faster, safer, and easier to load and unload than ever before. Many of the fittings—clamps, hooks, bridles, thimbles, saddles—are new, too. And this latest edition of the Tuffy Sling Handbook contains a host of other useful information: a complete rigger's manual, proof tested ratings and specifications for all Tuffy Slings; a new engineer's notebook; data tables on a full line of versatile, easy-to-apply sling fittings.

**But don't delay** to order your *FREE* copy. Mail the coupon to us now. We'll send it to you by return mail with Tuffy's compliments—nothing to buy, no obligation. Hurry. The supply is limited!

### YOU CAN'T HURT A TUFFY SLING

Loop it, pull the loop taut. Tuffy's 9-part machine braided wire fabric construction resists kinking. But if you *are* able to kink it, you can straighten it out quickly and without materially damaging the fabric.

### New Tuffy® Ferrule Makes Sling History

It's on all Tuffy Slings, but it doesn't cost you a penny extra. There's no sling ferrule like it anywhere. Tuffy's streamlined metal ferrule is set on the eye splice under pressure so great that the inner metal virtually flows into the voids between the wire fabric. A force of friction is created so great that the eye splice has strength equal to that of the famous machine braided Tuffy wire fabric. It makes Tuffy Slings stronger. It makes them safer: The ends of the tapered ferrule are swaged tightly to the fabric leaving no edges to hang up on loads or to injure workers' hands in hitching to and unhitching from sling loads. There's still another advantage—because Tuffy Slings are easier and safer to load, they're also faster to load. Your men can do more work when they're working with Tuffy Slings.

### CONSULT YOUR DISTRIBUTOR

when you want to buy Tuffy Slings or Tuffy Hoist Lines. Give him your requirements. He'll stock an inventory for you to draw against. It saves you time and money.

### New Tuffy® Ferrule

has no sharp edges to injure hands or catch on loads. The tapered and rounded ends are swaged tight to the sling fabric. The tremendous pressure at which the ferrule is pressed around the machine braided wire fabric flows the metal into the voids of the eye splice and gives the eye splice 100 percent of the strength of the fabric.

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Specialists in high carbon wire, wire rope, braided wire fabric, stress relieved wire and strand.

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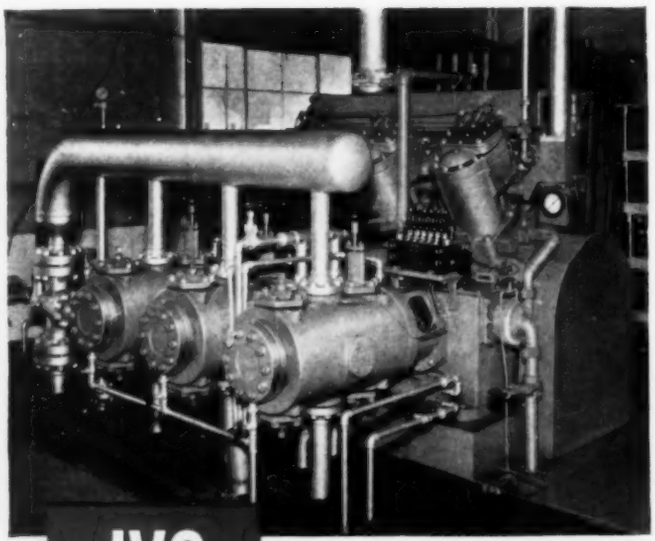
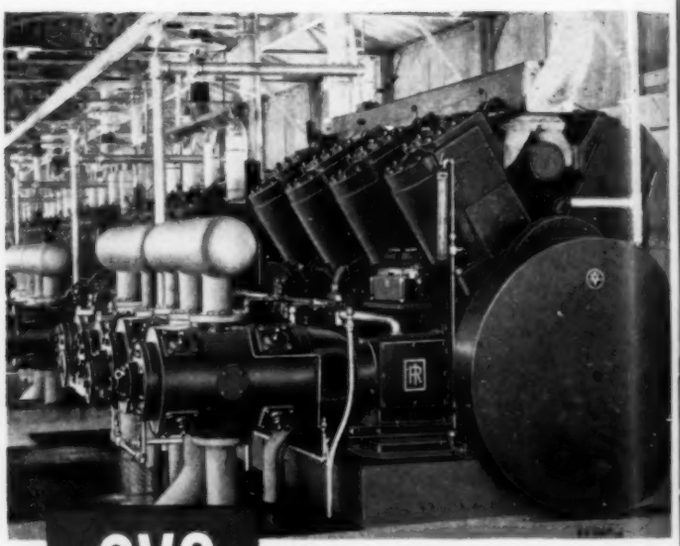
# have these two c



**JVG**

110 to 220 hp

*Ingersoll-Rand JVG gas-engine compressor installed on a natural gas pipe line for recompression from 350 psi intake to 410 psi discharge.*



**SVG**

330 to 660 hp

*Bank of five I-R gas-engine compressors in gas booster service. SVG unit in foreground compresses natural gas from 47 to 400 psi.*

## *From 110 to 2000 hp, these I-R units have two advantages that set them apart from all others!*

A gas-engine compressor is really *two* machines in one. A gas engine to provide the *power* and a compressor to do the *work*. In each of these equally important functions, Ingersoll-Rand has, over the years, pioneered and perfected basic types of construction that are common to their entire line of gas-engine compressors.

### 1. *Four-cycle Flexibility*

Every I-R unit utilizes a V-type *four-cycle* engine. That's because only the four-cycle engine assures stable and dependable operation over the widest range of speeds and loads. It delivers smooth power all the way from half speed to full speed and from no load to full load, or any combination within this range. In many applications this four-cycle flexibility of loading is a vital necessity to meet the load swings and speed variations that are a part of normal operation.

Even where speeds and loads are fairly constant under normal conditions, the four-cycle engine provides a valuable margin of safety to take care of unexpected or emergency fluctuations in speed and load without danger of stalling out.

### 2. *Compressor cylinders engineered to the job . . . using valves from the most complete line available.*

Every I-R gas-engine compressor uses compressor cylinders and valves that are tailored to meet the

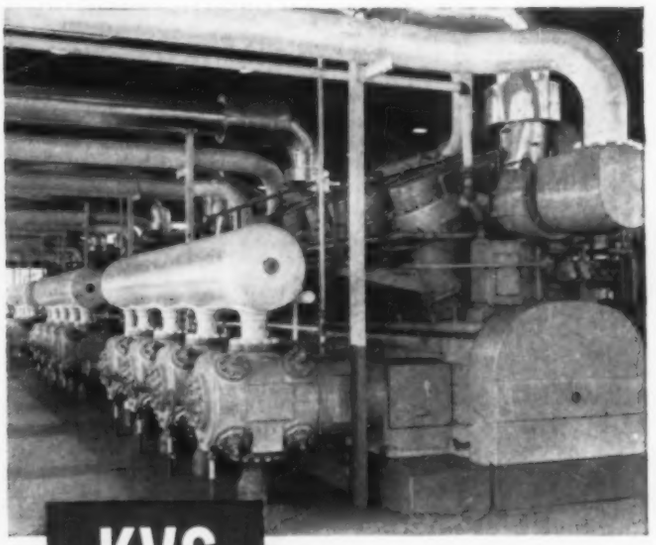
**COMPRESSORS** • **CONDENSERS** • **AIR & ELECTRIC TOOLS**

# s-engine compressors
# o outstanding features

**KVG**

880 to 1,320 hp

*Six Ingersoll-Rand KVG gas-engine-driven compressors installed on a large Southwestern transmission line.*



**KVS**

2,000 hp

*Four of seven Type KVS turbo-charged gas-engine compressors installed in a large gasoline plant. Each unit compresses process gas from 0 to 800 psi.*

precise requirements for each application. Their world-wide reputation for lasting dependability and reduced maintenance is the result of more than 77 years of specialized experience in designing and building air and gas compressors.

Ingersoll-Rand valves are the most dependable available. Complete records from many pipeline compressor stations show that I-R valves run for many months without forcing a compressor shutdown. And Ingersoll-Rand has valves to cover the entire range of operating requirements for any pressure, any type of gas . . . more types and sizes of compressor valves than any other manufacturer.

These two basic advantages . . . four-cycle flexibility and the extra dependability of job-engineered I-R compressor cylinders and valves . . . add up to long-range savings in operating and maintenance costs.

Your nearest Ingersoll-Rand representative will be glad to give you all the facts on any type of unit. His wide experience in the selection, application and installation of this equipment can save you time and expense all along the line.

**Ingersoll-Rand**

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4 CYCLE

PUMPS • ROCK DRILLS • GAS & DIESEL ENGINES

Wyo., and to 32,000 barrels daily into Denver.

The company's expansion program included addition of a 24-mile loop of 8-inch pipe between Guernsey in Wyoming's Platte County and Horse Creek, 30 miles northwest of Cheyenne; construction of 35,000-barrel and 55,000-barrel tanks at Guernsey and an electric booster station near Ault, Colo.; and installation of pumping units at Chugwater, Wyo., and Horse Creek.

## El Paso Natural, Nevada Natural Receive FPC Okay

El Paso Natural Gas Company has received authorization from the Federal Power Commission to construct pipe line facilities estimated to cost $194 million to make additional natural gas available to existing customers in California, Nevada, Arizona, New Mexico and Texas. The authorization includes exchanges of natural gas with Pacific Northwest Pipeline Corporation.

The FPC at the same time authorized Nevada Natural Gas Pipe Line Company to build new facilities costing $4 million to enable it to transport additional gas to be received from El Paso.

El Paso's project will expand its system by 455 million cubic feet of natural gas per day. Of this amount the company will deliver gas to Southern California Gas Company, Southern Counties Gas Company of California, Pacific Gas & Electric Company, Nevada Natural and to existing customers in Arizona, New Mexico and Texas.

El Paso's project includes the construction of 413 miles of 34-inch pipe extending from the San Juan Basin and looping existing lines to a point on the Arizona-California border near Topock, Ariz. Part of the new gas supply for this expansion will be imported from Canada and exchanged with Pacific Northwest for gas in the San Juan Basin. However, most of the gas will come from the company's own sources in the San Juan Basin and the Permian Basin. Additional compression will be installed on the 30-inch Permian-San Juan crossover line to handle the new Permian Basin gas.

## Texas Gas Authorized To Add Pipe Line Facilities

The Federal Power Commission has filed a decision authorizing Texas Gas Transmission Corporation to construct new pipe line facilities to connect its transmission system with additional natural gas reserves in Louisiana.

The decision also grants certificates to three independent producers, The Atlantic Refining Company, the California Company and Union Oil Company of California, authorizing them to sell natural gas to Texas Gas.

Texas Gas will build a 105-mile supply line extending from a point in the East Lake Palourde Gas field, Assumption Parish, La., where gas will be purchased from the three producers, to Texas Gas' system near Eunice, La. Texas Gas also proposes to construct loops paralleling sections of its existing system in Arkansas, Mississippi, Tennessee, Kentucky, and Indiana and additional compressor facilities totaling 19,190 horsepower. Estimated cost is $19.9 million.

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Pneumatic-Tired Lowering-in Cradle
SAVES TIME, MONEY, EQUIPMENT
Consists of an adjustable frame with rubber guide rollers and large auto-tire conveyor rollers. Coated and wrapped pipe is gently guided into the ditch while the tractor moves steadily along the line. Sizes are available for three groups of pipe diameters: 4" to 12", 12" to 24", 20" to 36". Eliminates need for extra side-boom tractor and a belt man. Saves time lost in "leapfrogging" two tractors. Speeds operations. Call for a demonstration! No obligation, of course.
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# STAYNEW® FILTERS

Dollinger makes ALL TYPES of filters as shown on this page, plus special filters for unusual filtration problems. New users of one specific type of Staynew filters often find a second Dollinger filter performs a great, added service in other processes or operations. Perhaps we can serve major or other filtration needs of your plant.

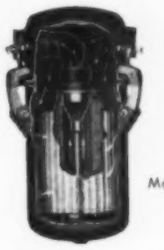
## LIQUID FILTERS

Model HE (Sump) Liquid Filter Bulletin 330

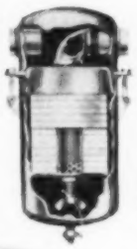
Model ELS (Pressure) Liquid Filter Bulletin 300

## PIPE LINE FILTERS

Model CPH Pipe Line Filter Bulletin 200



Model CVH (Vacuum) Pipe Line Filter Bulletin 200



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Model IDR (Ground Level) Air Intake Filter Bulletin 100

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Electro-Staynew Mist Collector Bulletin 420

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For more data on advertised products, use Readers' Service Cards, last page.



# Meet the new all-round pipeliner

## ALLIS-CHALMERS HD-11 TRACTOR-TRACTOMOTIVE SIDE BOOM

From super inch to feeder lines—whatever your pipe jobs might be, this new Allis-Chalmers HD-11 Tractor-Side Boom combination has the speed, maneuverability and exceptional lifting capacity to handle a wide range of pipeline jobs. This tractor cuts costs on jobs often done by bigger, more expensive machines—constructing feeder, distribution and smaller inch cross-country lines . . . maintaining, repairing and taking up existing gas, crude oil and product lines. Also, it's the practical size on the big inch lines for stringing pipe, setting T-joints and valves, handling pipe sections for welding crews and bending machines.

Get the full story on this new tractor-boom team. See your Allis-Chalmers dealer now.

CONSTRUCTION MACHINERY DIVISION, MILWAUKEE 1, WISCONSIN

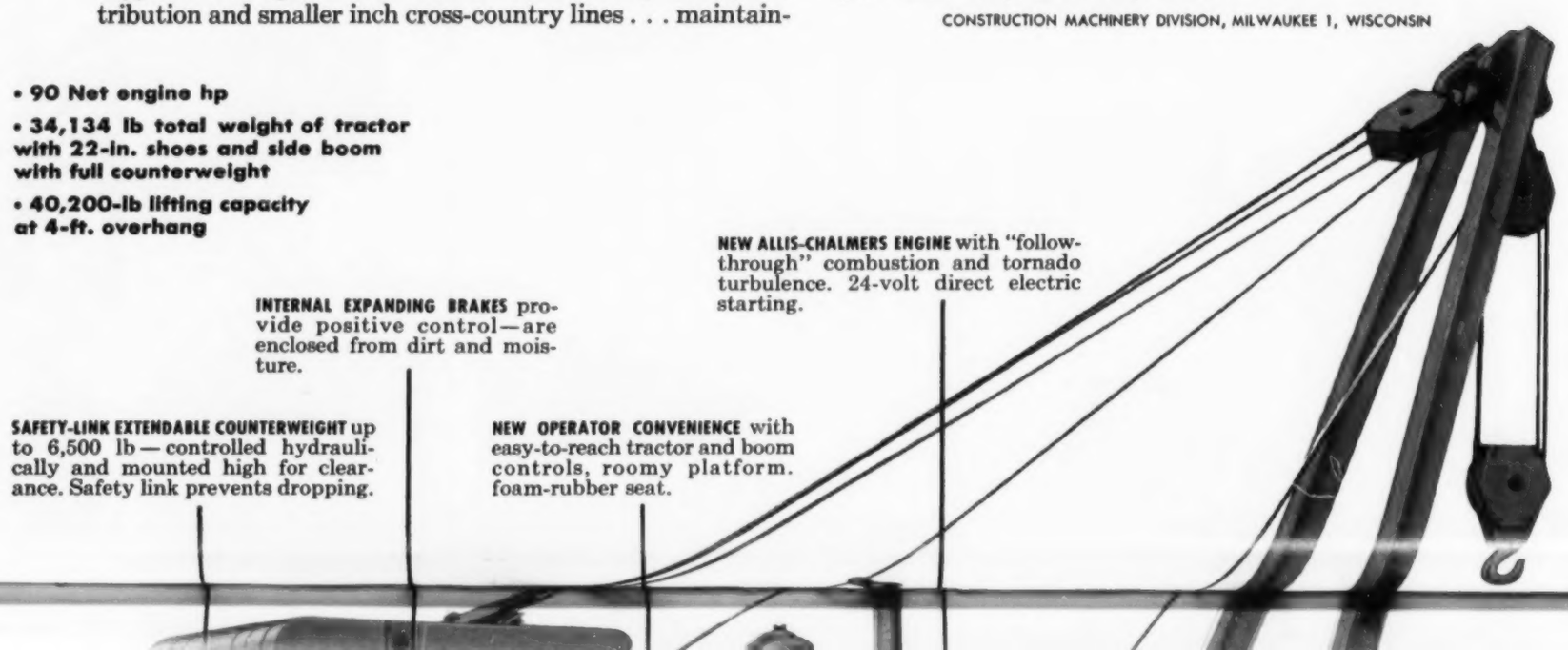
- **90 Net engine hp**
- **34,134 lb total weight of tractor with 22-in. shoes and side boom with full counterweight**
- **40,200-lb lifting capacity at 4-ft. overhang**

**NEW ALLIS-CHALMERS ENGINE** with "follow-through" combustion and tornado turbulence. 24-volt direct electric starting.

**INTERNAL EXPANDING BRAKES** provide positive control—are enclosed from dirt and moisture.

**SAFETY-LINK EXTENDABLE COUNTERWEIGHT** up to 6,500 lb—controlled hydraulically and mounted high for clearance. Safety link prevents dropping.

**NEW OPERATOR CONVENIENCE** with easy-to-reach tractor and boom controls, roomy platform. foam-rubber seat.



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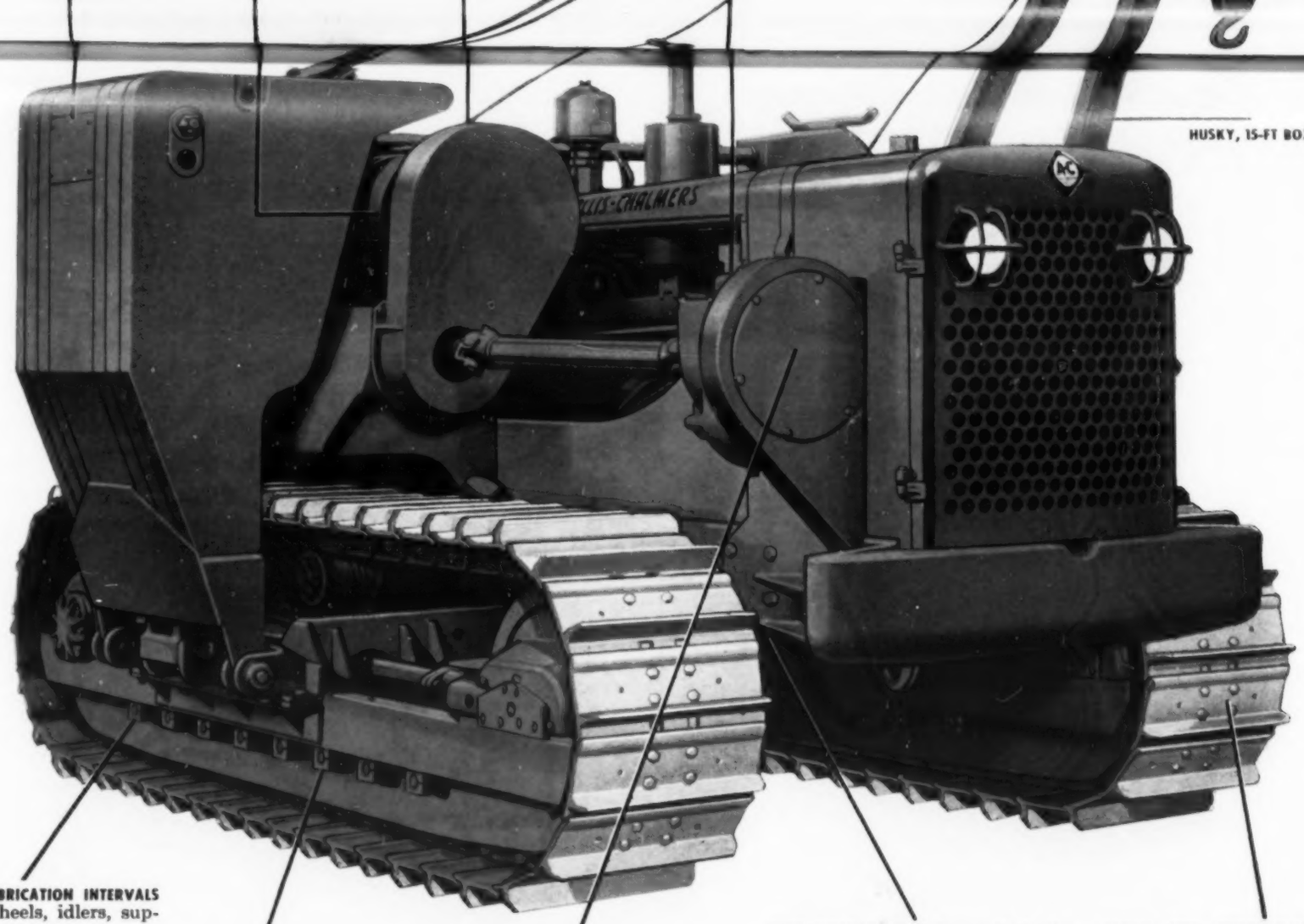
HUSKY, 15-FT BOX SECTION BOOM




**1,000-HOUR LUBRICATION INTERVALS** for truck wheels, idlers, support rollers.

**EXTRA HEAVY-DUTY TRUCK WHEELS.** Eight tapered roller bearing truck wheels for each track mean smooth, easy rolling.

**FRONT-MOUNTED POWER TAKE-OFF.** Power from engine crankshaft permits boom to work independently of tractor master clutch. Back of tractor free for rear-mounted equipment.

**HIGH CLEARANCES** underneath both tractor and counterweight plus smooth, clean tractor bottom mean steady going over rough terrain.

**TOUGH, NEW, THROUGH-HARDENED TRACK** is extra long for greater stability and flotation.

# ALLIS-CHALMERS

## Plantation Pipe Line To Build 327-Mile Line

Plantation Pipe Line Company has announced a $23.5 million expansion program for 1956 which includes the construction of a pipe line from Baton Rouge, La., the system's starting point, to Helena, Ala., south of Birmingham. The line will be an 18-inch diameter tube and will be laid next to the company's older 18-inch and 12-inch lines which move petroleum into Bremen Ga. The new line will increase capacity out of Baton Rouge from the present 245,000 barrels per day to 304,000 barrels per day.

Besides the new line, additional pumping stations are scheduled for service in 1956. Two new stations will be constructed on the system's 8-inch lateral line between Bremen and Chattanooga. These installations will boost the capacity of this branch line from 30,000 barrels per day to 38,000 barrels per day.

Plantation also plans to reactivate three pumping stations on the parallel 14-inch and 10-inch lines east of Bremen during 1956.

## Leonard Refineries Announces Merger

Leonard Refineries, Inc. has announced the purchase by Leonard of Mid-West Refineries, Inc., Roosevelt Oil and Refining Corporation, and Leonard Pipeline Company.

Reid Brazell, president of Leonard, also announced Leonard ownership of the following subsidiary companies: Leonard Crude Oil Company, Michigan-Ohio Pipeline Corporation, McClanahan Refineries, Inc. and ROC Terminal Company. Leonard Crude Oil Company and Michigan-Ohio Pipeline Corporation operate the common carrier and crude oil gathering facilities acquired by Leonard through purchase of Mid-West, Roosevelt and Leonard Pipeline Company. Included in the two pipe line systems are the common carrier and gathering lines formerly owned by the Michigan division of the Pure Transportation Company.

Michigan-Ohio Pipeline Corporation will operate a total of 350 miles of common carrier transportation pipe line facilities, including a 260-mile line between Toledo and Central Michigan.

## NACE Pipe Line Course Designed for Field Men

A two-day short course for pipe-liners, especially field men, is slated for January 19 and 20 in Oberholtzer Hall at the University of Houston sponsored by the Houston Section of the National Association of Corrosion Engineers. Activities will be divided equally between laboratory and field trips and classroom lectures.

Participants in the course are urged to bring corrosion specimens to the course and to present questions concerning corrosion samples and problems.

The registration fee of $10 does not have to be sent in advance, but persons planning to attend should notify Lloyd Nelson, Shell Pipe Line Corporation, Box 2648, Houston, so that arrangements can be made. The registration desk in Oberholtzer Hall on the University campus will open at 7:30 a.m. January 19.

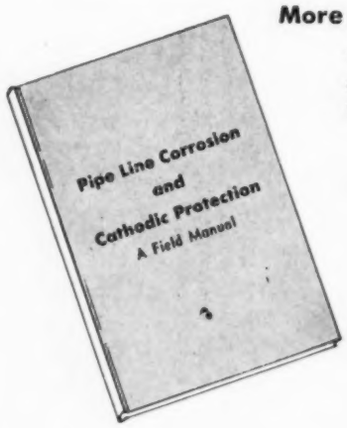
First day sessions include discussions on why pipe lines corrode externally and internally; fundamentals of cathodic protection; external coating for pipe lines; how to control internal corrosion; design, construction and maintenance planning for the prevention of corrosion of pipe lines.

## Magnolia Begins Work On 14-Mile Line in Texas

Magnolia Pipe Line Company has begun work on a new pipe line in Andrews County, Texas. The line is 14 miles of 8-inch with 4-inch, 6-inch and 8-inch feeder lines to serve leases in the area now producing sour crude.


**More comments on this new Handbook:**

"... a most practical on-the-job manual for men concerned with pipe line corrosion. We are ordering copies for each of our district engineers."




**Pipe Line Corrosion and Cathodic Protection**

By MARSHALL E. PARKER

This Handbook, written by Marshall E. Parker, consultant, is designed as a practical field manual. It is a 108-page pocket-size volume printed first as a popular series in WORLD OIL. The Handbook is illustrated with many charts and drawings and is completely indexed by subjects.

It presents comprehensive data on Soil Resistivity Surveys, Potential Surveys, Line Currents, Current Requirements, Rectifier Systems, Ground Bed Design, Magnesium Anodes, Stray Current Electrolysis, Interference in Protective Systems, Operations and Maintenance, and Coating Protection and Testing.

An appendix has been added of technical data on Underground Corrosion, Basic Principles of Cathodic Protection, Properties of Metals and Attenuation Equations. Order copies of this practical Field Manual now for each of your field men. Price $3.

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# NEW "KING-SIZE" CARTRIDGES SAVE TIME AND LABOR

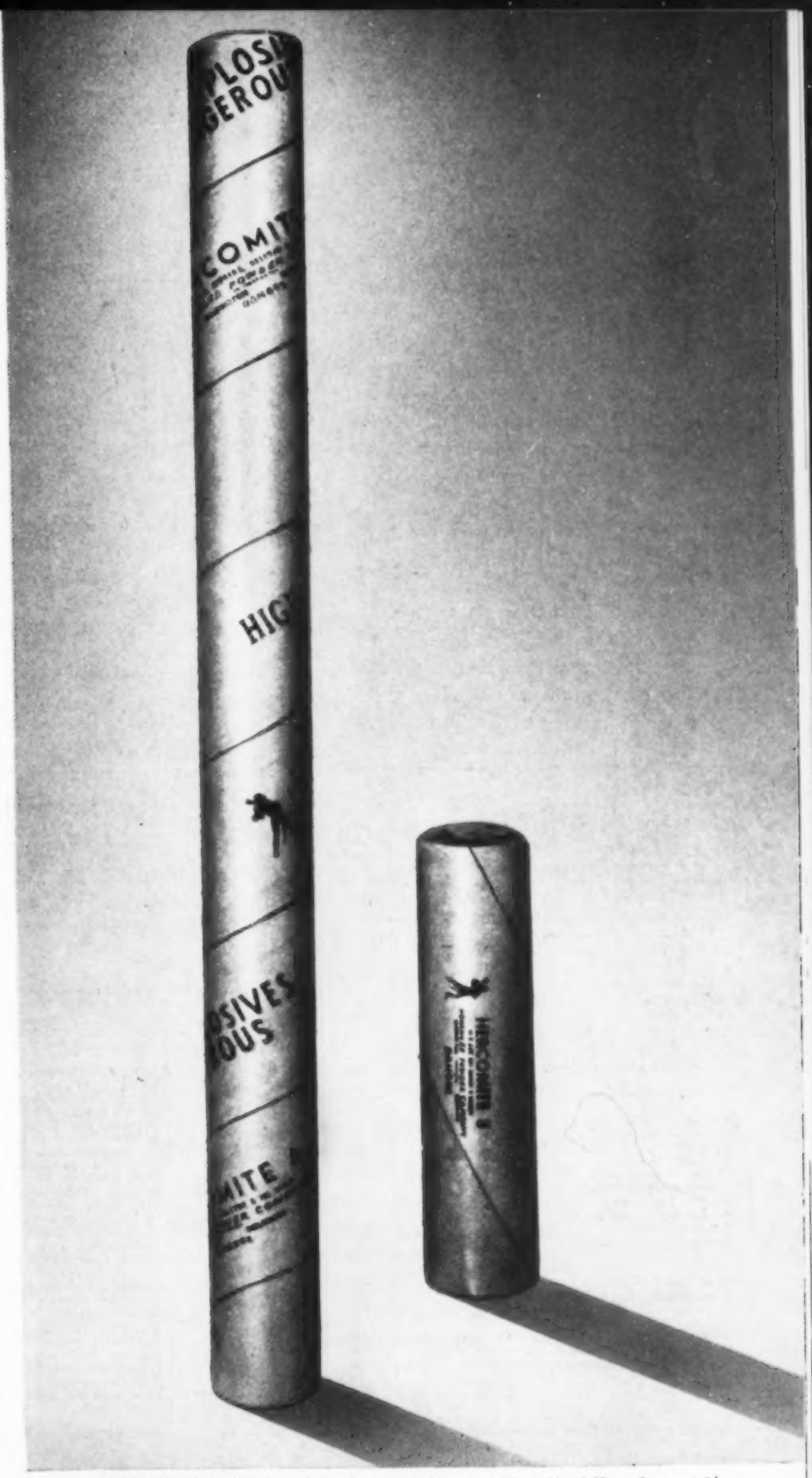
Now, Hercules produces "King-Size" cartridges in lengths of 24, 20, 16 and 12 inches, and in diameters of $1\frac{1}{4}$, $1\frac{1}{2}$, $1\frac{3}{4}$, and 2 inches.

Available in all types of Hercules® dynamite, these long-length, small-diameter cartridges are now in full production.

"King-Size" cartridges make possible a more uniform fragmentation through the discharge of a single column of explosive. Their use means substantial savings in valuable time and labor in loading holes.

Hercules designed, tested, and installed special new packing machines for these "King-Size" cartridges.

Our technical service and sales representatives will be glad to discuss with you how these "King-Size" cartridges can go to work for you.



**THREE TIMES AS LONG** ... Here is one of the new "King-Size" Hercules cartridges—24 inches in length, shown alongside the same grade in the conventional 8 inch size.

HERCULES

*HERCULES POWDER COMPANY*
INCORPORATED
*Explosives Department, 939 Market St., Wilmington, Del.*

Birmingham, Ala.; Chicago, Ill.; Duluth, Minn.; Hazleton, Pa.; Joplin, Mo.; Los Angeles, Cal.; New York, N.Y.; Pittsburgh, Pa.; Salt Lake City, Utah; San Francisco, Cal.

XH16-2

## 236-Mile Gas Line Planned For Southern California

The Southern California Gas Company and the Southern Counties Gas Company have filed an amended application with the California Public Utilities Commission for construction of a 236-mile line from Topock on the Colorado river to Newhall. The new line will bring additional 177 million cubic feet of gas daily from out of the state to supply the two companies' 2 million customers in southern California. El Paso Natural Gas Company has been authorized by the FPC to increase its deliveries to the southern California companies by that amount.

Upon approval of the application, the two local companies propose to begin building this new line early next year. Gas delivered at Newhall would arrive in the metropolitan area over a 41-mile segment to Alhambra that is not a part of this application. The total estimated cost of both lines and auxiliary facilities is $30,750,000.

This new system will meet a new El Paso line at Topock to take gas out of the San Juan Basin in southern Colorado and northern New Mexico and the Permian Basin in the Texas Panhandle. When completed and in full operation in 1959, El Paso's deliveries to the two companies will total 890 million cubic feet daily.

## Pure Transportation Company Sells Pipe Line Properties

Pure Transportation Company, a subsidiary of the Pure Oil Company, has announced the sale of its pipe line properties in Michigan.

Under the sale, Michigan-Ohio Pipeline Corporation takes title to 41½ miles of crude trunk line from the Purtell tank farm near Mt. Pleasant to Bay City, Mich. Leonard Crude Oil Company bought 141½ miles of crude gathering lines.

## Union Oil Asks Bids For Pipe Line Terminals

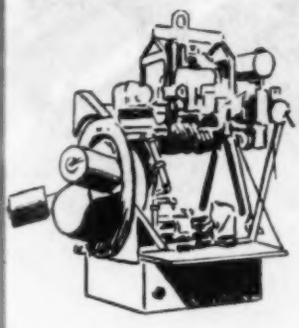
Bids are being asked for construction of a $450,000 pipe line terminal and marketing station in Colton, Calif., and a $668,000 terminal and accompanying facilities in Phoenix, Ariz., by Union Oil Company of California.

To be completed in 1956, the new facilities will make possible receipt of gasolines and diesel fuel from Union Oil's Los Angeles Refinery via the Southern Pacific Company pipe line which connects with Union's own pipe line system at Watson, Calif.

Storage capacity of 67,000 barrels will be provided at the 12-acre terminal site outside Phoenix in Maricopa County, where the products will be taken from the Southern Pacific pipe line. A 5½-mile, 4-inch line will be installed from this terminal to Union's marketing station in Phoenix.

### Proposed Pipe Line Construction

| COMPANY | Length in Miles | Diameter | Type | Origin and Terminus | Estimated Cost | Status |
|---|---|---|---|---|---|---|
| Alabama-Tennessee Natural Gas Co.—Florence, Ala. | 21 | 8, 12 | Gas | Colbert County, Ala. loop. | $808,450 | Authorized |
| American Gilsonite Co. | 80 | | Gilsonite Slurry | Bonanza, Utah—Western Colorado, refinery | ..... | Considered |
| American Pipe Line Corp.—New York City (Swinerton & Walberg, Engineering) | 1,425 plus 485 miles feeders & distribution lines | 24, 26 | Products | Beaumont, Texas area—Newark, N.J. | $170 million | Approved ODM |
| Arkansas-Louisiana Gas Co. | 66 | 24 | Gas | Arkansas, Louisiana and Texas loops | $9,245,166 | Authorized |
| Big Horn Pipe Line Co.—Cheyenne, Wyo. | 150 | 8 | Crude | Ash Creek, Wyo. field—Midwest, Wyo. | ..... | Considered |
| California-Oregon Pipe Line System | 103 | 6 | Crude | Crescent City, Calif.—Medford, Ore. | $2 million | Planned |
| Central Kentucky Natural Gas Co. | 24 | 20, 24 | Gas | Cold Springs—Anderson Ferry, Ky. | $2.5 million | Authorized |
| Cities Service Gas Co.—1st National Bank Bldg., Oklahoma City, Okla. | 15.5 | 16 | Gas | Various locations in Kansas and Oklahoma | ..... | Planned |
| Coastal Transmission Corp.—Houston, Texas | 500 | 30 | Gas | McAllen, Texas—Louisiana connection, Houston, Texas Gas. | $70 million | Considered |
| Colorado Interstate Gas Co. | 115 | 4, 6, 8 | Gas | Denver—Julesburg Basin—Basin Cities | ..... ..... | Before FPC |
| | 328 | 16, 18 | Gas | LaPlata County—Pueblo, Colorado Springs and Denver | $21,600,000 | Authorized |
| Consolidated Gathering Systems, Ltd. | 198 | .... | Crude | Sturgeon Field—Edmonton. | ..... | Planned |
| Consolidated Natural Gas Corp.—New York | 112 | .... | Gas | In Ohio—Plus other smaller lines | $6 million | Planned |
| Cosden Petroleum Corp.—Big Spring, Texas | 100 | 6 | Products | Big Spring—Abilene, Texas | $1.5 million | Planned |
| Deep Rock Gas Co. | 120 | 6 | LPG | Tioga, N.D.—Canadian border | ..... | Planned |
| El Paso Natural Gas Co.—El Paso, Tex. | 414 | 34 | Gas | Parallel from San Juan Basin to Topock, Ariz. | $194 million | Authorized |
| Freedom-Valvoline Oil Co. | 34 | 8 | Products | Harpster—Findlay, Ohio | $700,500 | Planned |
| Houston Texas Gas & Oil Co.—4604 Main St., Houston | 961 | 12-30 | Gas | Baton Rouge, La.—Miami, Fla. | $110 million | Before FPC |
| Interprovincial Pipe Line Co. | 120 | 24, 26 | Crude | Cromer, Manitoba—Clearbrook, Minn. | $9 million | Planned |
| Iraq Petroleum Co. | 75 | 24 | Crude | Homs, Syria to Tripoli, Lebanon | ..... | Considered |
| Lone Star Gas Co.—Dallas | 230 | 22, 26 | Gas | Cotton County, Okla.—Fritch, Texas | $18.7 million | Before FPC |
| | 205 | .... | Gas | Snyder, Texas to tie in with Cotton County, Okla.—Fritch, Texas line | ..... | Before FPC |
| Malco Pipe Line, Inc. | 91 | 6 | Products | Prewitt, N.M.—Albuquerque | $1,250,000 | Considered |
| Manufacturers, Gas, Light, and Heat Co. | 72 | 16-20 | Gas | Doddridge, Wetzel, and Marshall Counties, W. Va. | ..... | Planned |
| | 213 | 3-26 | Gas | Various locations in Pa., W. Va., and Ohio | ..... | Planned |
| | 40 | .... | Gas | Allegheny, Washington, and Beaver Counties, Pa. | ..... | Planned |
| Michigan-Wisconsin Pipe Line Co.—500 Griswold, Detroit | 252 | 4-24 | Gas | Various locations in Illinois and Wisconsin | $11 million | Planned |
| Midwestern Gas Transmission Co., Houston, Texas | 1112 | .... | Gas | Emerson, Manitoba—Nashville, Tenn. | $98 million | Before FPC |
| Montana-Dakota Utilities Co.—Minneapolis | 44 | .... | Gas | Various locations in S.D. and Wyoming | $1.4 million | Authorized |
| | 41.8 | 12 | Gas | Williams County, N.D. | $1.4 million | Authorized |
| NATO | 1920 | 4-10 | Products | To serve military bases in Western Europe | ..... | Foster-Wheeler Prime Contractors, 875 miles let |
| Natural Gas Pipe Line Co. of America—20 N. Wacker Dr., Chicago | 350 | 20, 26 | Gas | Wise County, Texas—Fritch, Texas | $28.5 million | Before FPC |
| Nevada Natural Gas Co. | 114 | 12, 16 | Gas | Various loops along Needles, Calif.-Las Vegas, Nev. line | $2.5 million | Planned |
| New York State Natural Gas Corp. | 56.5 | 30 | Gas | Tioga County, Pa. | $7 million | Before FPC, 12 miles Authorized |
| North Carolina Natural Gas Corp. | 575 | 3-16 | Gas | Mooresville easterwardly across North Carolina | $13 million | Planned |
| Northern Natural Gas Co.—2223 Dodge St., Omaha | 167 | 24 | Gas | Farmington, Minn. to Duluth, Minn. and Superior, Wis. | $12 million | Before FPC |
| | ..... | .... | Gas | To interconnect with Natural Gas Pipe Line | $244,000 | Planned |
| | 28.4 | 30 | Gas | Test lines to underground storage near Redfield, Iowa | $4.8 million | Before FPC |
| | 15 | 24 | Gas | To main line in Nebraska | ..... | Before FPC |
| | 163 | 10, 12 | Gas | Various locations in South Dakota, plus 307 miles of branch lines | ..... | Before FPC |
| Northwestern Utilities, Ltd.—10124-104th St., Edmonton, Alberta, Canada | 6 | 6 | Gas | Iowa loop and compressor additions in Texas | $700,000 | Before FPC |
| | 42 | 12 | Gas | Bonnie Glen—Edmonton, Alberta | $1.4 million | Planned |
| Offshore Gathering Corp., Houston | 364 | 24, 26, 30 | Gas, Crude | Texas side of Sabine River 25 miles offshore La. to Mississippi side of Pearl River | $150 million | Before FPC |
| Pacific Gas & Electric Co. | 190 | 34 | Gas | Various loops, between Topock, Ariz.—Milpitas, Calif. | $4 million | Planned |



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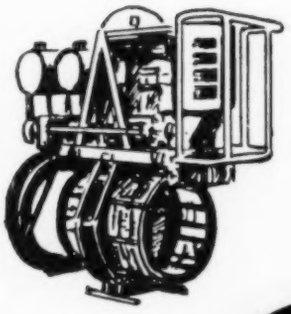

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## Proposed Pipe Line Construction—(Continued)

| COMPANY | Length in Miles | Diameter | Type | Origin and Terminus | Estimated Cost | Status |
|---|---|---|---|---|---|---|
| Pacific Northwest Pipe Line Corp.—M & M Bldg., Houston | 1770 plus 443 | 22, 26 | Gas | San Juan Basin—Pacific Northwestern states and Canadian border terminus near Sumas, Wash. | $246 million | Contracts let for 1221 miles |
| Petroargentina | 370 | 16 | Crude | Newguen—Bahia Blanca, Argentina | $40 million | Planned |
| Petroleos Mexicanos—Ave. Juarez, 94, Mexico City | 440 | 20 | Gas | Brazil—Tampico—Poza Rica, Mexico | ..... | Planned |
| | 260 | 6, 8 | Products | Lagos, Mexico—Guadalajara, Aguascalientes and Salamanca | ..... | Planned |
| | 145 | 12 | Crude | 18 de Marzo Field—Monterrey, Mexico | ..... | Considered |
| | .... | .... | Gas | Macuspana region of Tabasco to Veracruz port of Minatitlan | $6 million | Planned |
| Phillips Petroleum Co.—Bartlesville | 54 | 6 | Products | Goldsmith—Borger, Texas | ..... | Planned |
| | 50 | .... | Ethylene | Sweeny—Pasadena, Texas | ..... | Planned |
| Pioneer Natural Gas Co. | 261 | 3-22 | Gas | Various locations in Texas Panhandle | ..... | Planned |
| Plantation Pipe Line Co. | 327 | 18 | Crude | Baton Rouge, La. to Helena, Ala. | $23.5 million | Planned |
| South Alberta Pipe Line, Ltd. | 46 | 10 | Gas | Etzikom Field—Medicine Hat, Alberta | $1 million | Planned |
| Southern Calif. Gas Co. and Southern Counties Gas Co. | 278 | 30 | Gas | Topock, Ariz.—Newhall | $31 million | Planned |
| Southern Natural Gas Company | 39 | .... | Gas | Various locations in Ga. and La. | $2.2 million | Authorized |
| Standard Pipe Line Co. | 330 | 16 | Crude | Wink, Texas—Albuquerque, N.M. | ..... | Before ODM |
| Standard-Vacuum Oil Co. | 90 | .... | Crude | Lirik Field, Palembang, Sumatra | ..... | Planned |
| Stanmount Pipe Line Co. | 140 | 10 | Crude | Cayiga and Beaver Lake Fields, N.D. to connect with Interprovincial Pipe Line | ..... | Planned |
| Sturgeon Pipe Line Ltd. | 100 | 12 | ..... | Sturgeon Lake Field—Trans-Mountain system | $6,500,000 | Planned |
| Sunflower Pipe Line Co.—Tulsa, Okla. | 265 | 3-6 | LPG | Kearny, Grant and Haskel Counties, Kansas—Wichita, Kansas | $3.5 million | Authorized |
| Tennessee Gas Transmission Co.—Box 2511, Houston (See also Midwestern Gas Transmission Co.) | 220 | 26, 30 | Gas | Loops in Kentucky and Ohio plus 376 miles of Supply | $56 million | Authorized |
| | 100 | .... | Gas | Gathering lines in Texas and Louisiana plus station additions | $18.6 million | Before FPC |
| | 1,050 | .... | Gas | Border near Emerson, Manitoba—Nashville, Tenn. | ..... | Proposed |
| | 162 | .... | Gas | Loop Lines in Kentucky, Ohio, and Pennsylvania | $24.3 million | Before FPC |
| Texas Eastern Transmission Corp. | 422 | 30 | Gas | McAllen to Vidor, Texas | Estimated | Planned |
| | 530 | 30 | Gas | Loops at various points between Kosciusko, Miss. and Uniontown, Penn. | Cost of Entire Project | Planned |
| | 45 | 24 | Gas | Provident City, Texas crossover to McAllen-Vidor line | $150 Million | Planned |
| | 135 | | | Supply and delivery lines laterals | | Planned |
| Texas Eastern Transmission Corp. and Texas Eastern, Penn-Jersey Corp. | 11 | .... | Gas | Loops in Philadelphia area plus compressor facilities | $2.4 million | Authorized |
| Texas Gas Transmission Corp | 198 | 20 | Gas | East Lake Palourde Gas field, La. to Eunice, La. and loops paralleling existing system in Arkansas, Mississippi, Tennessee, Kentucky, Indiana | $20 million | Authorized |
| | .... | .... | Gas | Houston, Texas—Miami, Fla. | ..... | Considered |
| Trans-Canada Pipe Line, Ltd.—Calgary, Alberta | 2240 | 30, 36 | Gas | Alberta—Eastern Canada | $297 million | Planned |
| Transcontinental Gas Pipe Line Corp.—3100 Travis St., Houston | .... | .... | Gas | Connecting facilities with Texas Eastern Penn-Jersey in Pennsylvania and New Jersey | $131,628 | Authorized |
| | 24.2 | .... | Gas | Gathering Lines from South Bayou Mallet, Maxie and Happytown Fields, La. | $754,000 | Authorized |
| United Gas Pipe Line Co. | 63 | 16, 20 | Gas | Various locations in Miss., Ala. and Florida | $8.3 million | Authorized |
| United Natural Gas Co. | 50 | 12 | Gas | Elk County—Jefferson County, Pa. | ..... | Planned |
| U. S. Navy | 450 | 8 | Gas | Gubik Field—Fairbanks, Alaska | $20 million | Planned |
| Washington Gas Light Co.—Washington, D.C. | 11 | 24 | Gas | Chillum Station—Gordon's Corner, Md. | $2 million | Authorized |
| Westcoast Transmission Company, Ltd. | 270 | 8-26 | Gas | Various locations in Peace River region | ..... | Planned |
| Wilcox Trend Gathering System, Inc. | 16 | 16 | Gas | Gathering lines to Provident City, Texas | $2.9 million | Before FPC |
| Winnipeg and Central Gas Co. | 450 | 4-8 | LPG | Tioga, N D.—Winnipeg, Canada | $20 million | Planned |


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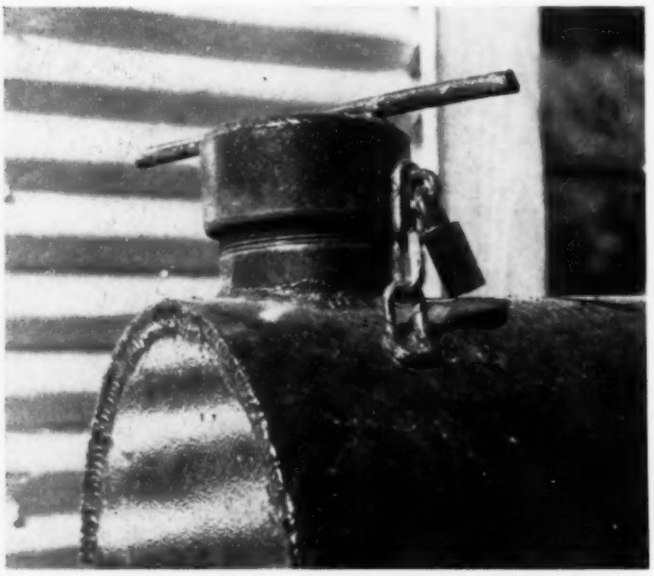
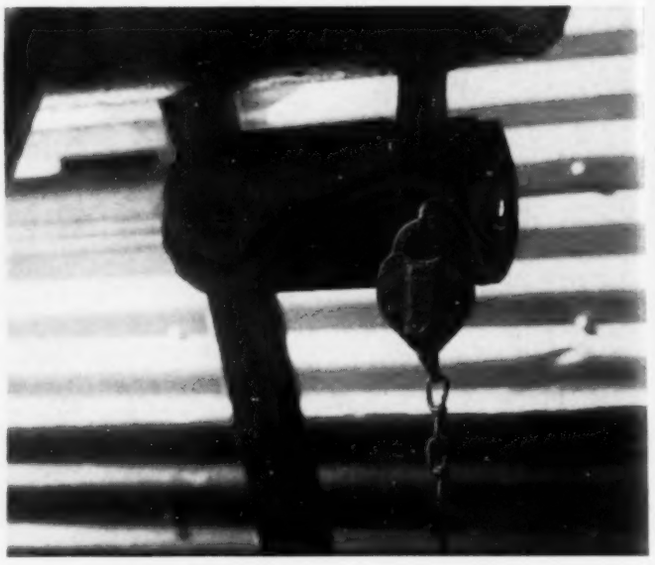
# How to do it

# PIPE LINE HINTS

**$10 is paid for each illustrated acceptable contribution. Mail to The Editor, PIPE LINE INDUSTRY, P. O. Box 2608, Houston 1, Texas**





## Locking Devices Protect Against Fuel Theft

Two places to stop fuel theft from storage tanks are at the filling cap and at the drain. Effective locking devices can be simply constructed for protection from theft.

At left is shown a locking device on the storage tank made by welding a short length of heavy chain to the tank. A link from the chain is cut off and welded to the gas tank cap to protrude in much the same manner as a hasp shackle. Then the last link in the chain is slipped over the half link welded to the cap and a lock fastened in place. The cap is held securely and can only be opened by personnel who have been issued a key to the lock.

In fabricating this lock, it is necessary to determine the point at which the cap is securely screwed on so that no error will be made in the placement of the half link.

Illustrated at right is a valve handle locking cover. The valve shown is a 1-inch gate valve used as a drain. To protect it, a length of 4-inch pipe is welded up. A slot in the open end is cut to allow the pipe to be slipped over the valve and allow some excess at the open end. In the opposed sides of this open end, two slots are cut to allow a strap of steel formed in a T shape to be inserted in one side and extend across the opening to the opposite side.

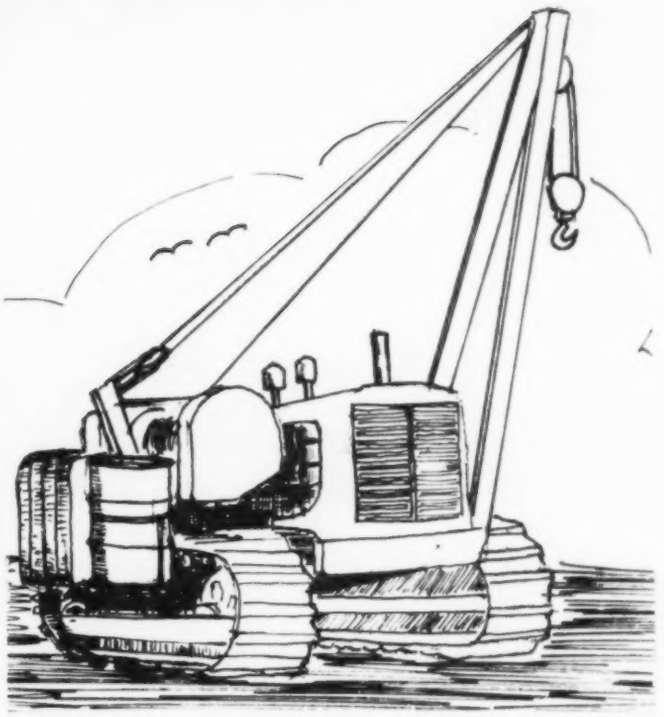
In the small end of the strap, a hole is cut to allow a lock to be slipped through and thus, a tamper-proof valve guard is created. The lock keeps the strap from being removed on one side and the large end of the T bar prevents its removal from the other side. With slight modification and packing with cork or sawdust, this can be made freeze-proof for winter use.

## Fabricate Hinged Ramp To Load Tractor Quickly

When tractors must be moved frequently on pipe line construction jobs, a folding ramp on the back of a trailer will save the driver from having to find a loading bank.

The ramp is made by extending the back of the trailer approximately three feet, then adding a two-foot hinged ramp. Cleats are welded across the base of the ramp to provide traction for the tracks.

The truck can be stopped at any desired place and the tractor driven up onto the trailer. The tractor can be unloaded quickly after the ramps have been swung down in place.



## Drum of Water on Tractor Adds Needed Counterweight

Additional weight on the right side of a tractor is often helpful when the tractor is used for handling large diameter pipe. One contractor keeps a spare drum full of water on the tractor which cradles for the doping and wrapping machine.

The drum rests securely on the right side of the tractor next to the counterweights and is a handy water supply for the wrapping machine. The cradle for the drum is made of steel reinforcing bars with one passing around the drum and welded to another passing underneath. An additional bar running diagonally toward the back braces it away from the tracks. It rests on a plate base as shown.

In the morning the drum is filled and the weight helps keep the tractor on an even keel. Whenever water is needed on the doping and wrapping machine, this ready supply is handy.

## Use Coal Tar To Protect Concrete Field Molds

On concrete-coated lines which are laid joint by joint into the water, the green concrete at the weld must be protected from washing and leaching. One way to do this is to flood the top and ends of the light gage metal form with coal tar, thus waterproofing the concrete.

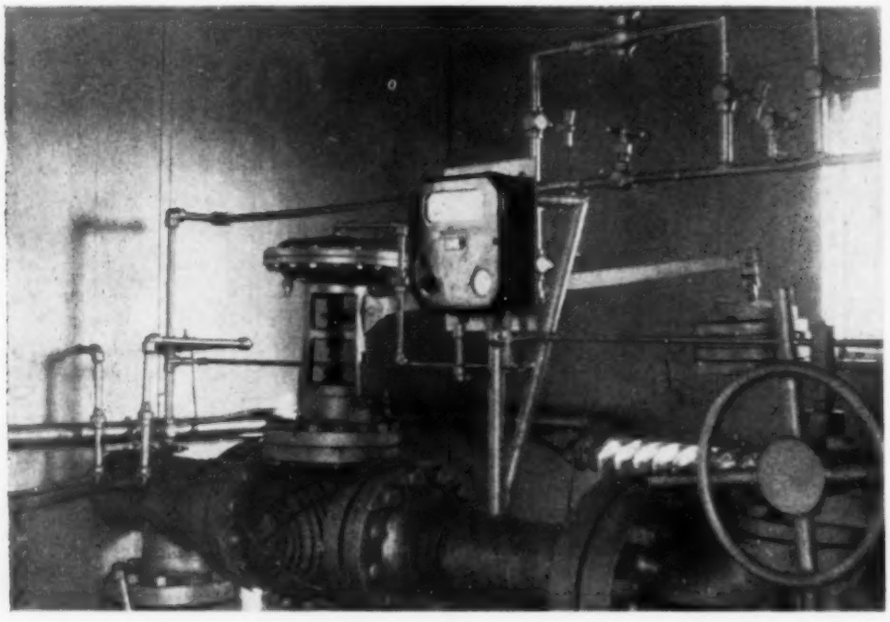
## Stand of Big-Inch Pipe Holds Joints to Be Welded

Save time at the beginning of a pipe line construction job by making a simple stand to hold the pipe to be welded. Use a joint of bigger-inch pipe and prop it up so that one end is approximately a foot from the ground. Place the pipe to be welded inside the big-inch pipe and wedge it fast. In this way the pipe line job is simulated, yet the nipple is readily accessible for cutting out the coupons for weld strength tests.

## 3 Welding Machines on Tractor Speed Job

The tractor shown here carries everything needed by the stringer-bead or hot-pass welder on a big-inch pipe line construction job. On it are three welding machines, beveling and cutting equipment, external and internal line-up clamps, and night caps. In addition, the machine has a shade for the welders and tractor driver.

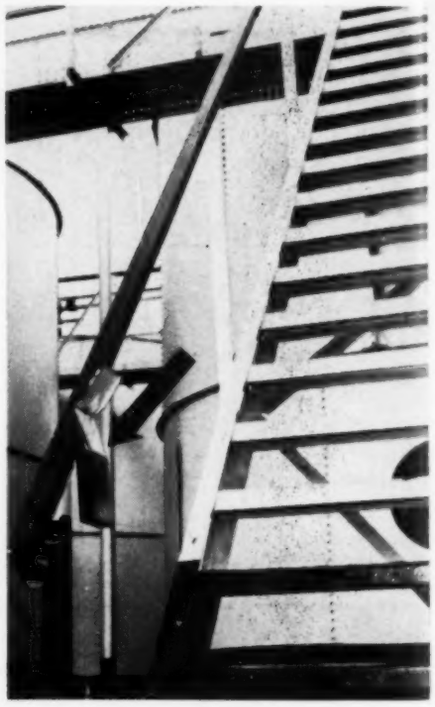
While this may seem like a large amount of equipment to tie up for this operation, the entire construction is keyed to it, and the reliability will pay off over the day's work.



## Steam Heat Prevents Freeze-Offs

To prevent freeze-offs at a natural gas pressure regulator, one pipe line company wrapped the outside of the body of the regulator, spirally and across, with ¼-inch diameter soft copper tubing and connected the ends of the copper tubing to a nearby steam heating radiator, also located in the regulator house. The steam heating radiator is pictured, behind the valve wheel in the lower right foreground.

In this example, the regulator house is located in a corner of the compressor station yard. Low pressure steam from the central heating boiler is piped over to the regulator house where it is connected to two ordinary house-heating cast iron steam radiators located inside the regulator house. To bring warmth directly to the regulator valve cage, the soft copper tubing is used. This set-up has been in use for the past two successive winters. Freeze-offs of the regulator valve, which were regular winter problems prior to the use of this installation, have now become virtually non-existent.



## Mount Box on Tank Ladder To Collect Run Slips

When a storage tank is placed on the pipe line and the oil is run, the run slips sometimes get lost, torn or stolen before they reach the proper person. Usually a receptacle of some kind is provided for these sheets or an arrangement is made so that the foreman or pumper will know where to collect them.

One receptacle on a Gulf Coast operator's lease was made of thin sheet metal strips soldered together and was similar to a mail box, complete with a hinged lid. This receptacle was fastened to the hand rail of the tank ladder and provided a handy place for the pipe line gager to leave his slip after taking the final tank gage.

# NOW...

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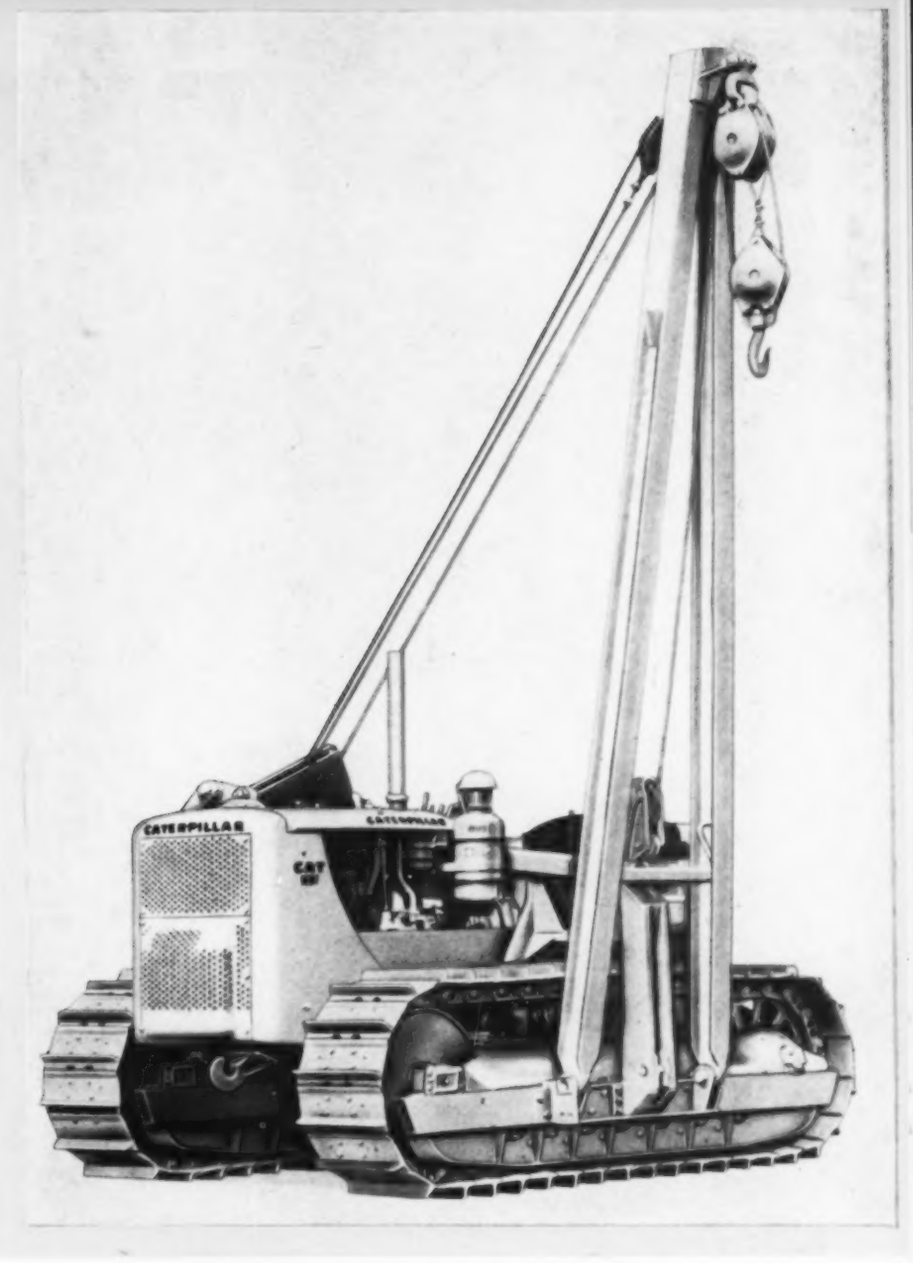


To match your pipelaying requirements even better, a 7-roller track frame MD7 is now available.

The long, 7-roller track frame, made available in response to suggestions from many pipeliners, provides the extra stability, traction and flotation needed on rugged pipeline jobs. This long track frame, with 22-inch shoes, makes possible increased lifting capacity up to 54,200 pounds. Still more versatility is given you in the MD7 by the choice of a 15-foot, 18-foot, or 20-foot boom.

The rugged D7 Tractor, which powers the MD7, has long been a favorite of pipeliners everywhere, and now, with 128 HP and trouble-free oil clutch, is more in demand than ever.

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**PIPELAYERS TO MATCH YOUR JOB NEEDS**

## Small Conveyor Loader Speeds Work

The light, inexpensive conveyor loader with an endless belt and a hopper at one end can save time and labor on a construction job.

The mix of aggregates and cement are loaded into the hopper in proper proportions and are fed into the mixer which is placed at proper elevation for pouring. This eliminates pushing wheelbarrows and Georgia buggies on an uphill grade.

## Use Aluminum Gates in Corrosive Area

In various oil field areas hydrogen sulfide corrosion is severe and metals that do not come in direct contact with the fluid can be corroded because of corrosive elements in the air.

To decrease maintenance costs around the tank battery, one operator uses creosoted wooden posts in place of metal posts. Gates to the tank batteries are made of an aluminum alloy that does not corrode and does not require the painting that steel gates would. With the hinges also made of this aluminum alloy, the necessity of frequent painting and maintenance jobs commonly needed in these areas is eliminated.

into. A ring from a junked car was then placed around the front and wood screws used to hold the light in place. Two U-bolts held it to the corner post of the cab as shown. With power supplied by the battery of the starting engine, it made late work easier and safer.

### Mount Headlight on Tractor For Special Night Work

One tractor operator who was being pushed on his backfilling duties scouted around for materials for a headlight and attached it to the standard on the cab.

Wires led to the battery on the starting engine and the light "frame" was made from a piece of plywood by cutting out a hole for the lamp to fit

### Use Pipe Line Ditcher To Cut Building Costs

Here is a time and money-saving idea for station construction where footings are poured for houses or sheds.

A working crew consists of four

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Offhand . . . you might say you save money when you buy direct from manufacturers.

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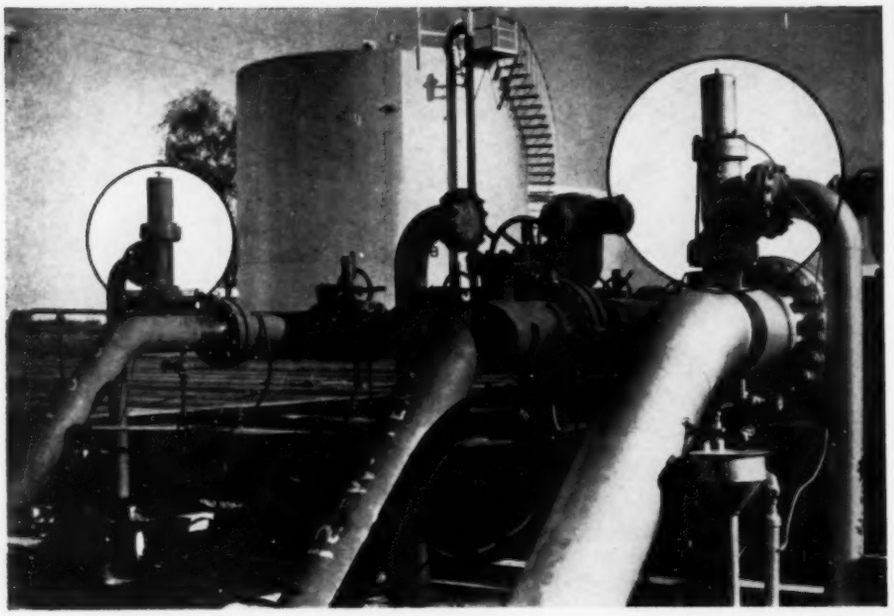

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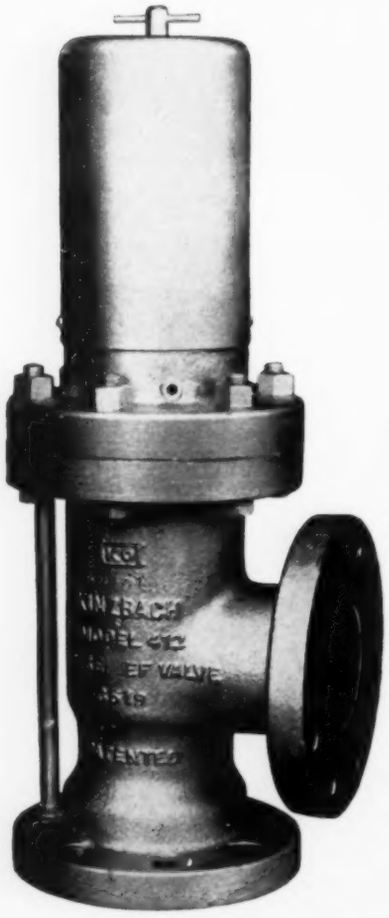

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When a pressure overload in the line is reached, the Kinzbach Model 412 Relief Valve opens instantly to full capacity. This valve provides automatic resetting at a pre-determined pressure drop, positive seating and facilities for functional testing.

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Kinzbach Model 412 Relief Valves are available in 2", 3", 4", 6" and 8" sizes for working pressures up to 1000 p.s.i. Write for Bulletin RV412 for full technical data.

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men—a layout man, a ditcher operator, an oiler or stake man, and an operator for a small scraper to level off the diggings.

On one housing job, this crew dug the footing trenches for more than 50 houses in one day. This job measured 300 lineal feet of trench, 13 inches wide by 12 inches deep for each house.

Good teamwork and quick maneuverability of the trenches enables it to cut short runs at high speed and turn sharply to continue digging in a different direction until all trenches for a house are dug.

## Holes in Rim of Can Aid Neat Paint Job

This simple idea will save cleanup time and reduce paint costs on station painting jobs. When the new can of paint is opened, punch several holes through the bottom of the sealing rim as shown. Then when the brush is wiped against the inside rim of the can, much of the excess paint will drip back down into the can.

It will save worthwhile amounts of paint and also make a neater job, reducing clean-up time and work. An added benefit is an easier resealing of the lid onto the can when the job is finished.

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# nothing beats experience!

. . . and the experienced full-time crews on H. C. Price Co. spreads know how to build quality into pipelines — and complete them on schedule.

**HCPCO 1955 CONSTRUCTION**

| Company | Size Pipe | Miles | Location |
|---|---|---|---|
| Tennessee Gas | 24″ | 68 | Pennsylvania |
| Tennessee Gas | 26″ | 35 | Ohio & Pennsylvania |
| Texas Eastern | 30″ | 132 | Mississippi & Louisiana |
| Texas Gas | 8″, 10″ & 16″ | 115 | Indiana |
| Texas Gas | 26″ | 77 | Tennessee & Kentucky |
| American Louisiana | 30″ | 185 | Kentucky & Indiana |
| Tennessee Gas | 30″ | 45 | Texas |

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**Bartlesville, Oklahoma — Cable HCPCO**

# Pipe Line Men

## IN THE NEWS

**Arkansas Louisiana Gas Company** has announced the following personnel changes: **A. H. Weyland,** president, has been named chairman of the board; **J. C. Hamilton,** senior vice president, promoted to president; **James C. Templeton,** general manager of the Coastal Oil Company, named vice president; and **M. D. LaGrone,** manager of Rate and Regulation department, named an assistant secretary.

•

**William N. Bonner, Jr.,** has resigned as secretary and general counsel of **Texas Gas Corporation** and its subsidiary companies.

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Wilbert K. Smith

Oscar M. Jaco

**Wilbert K. Smith,** assistant superintendent of the **Ohio Oil Company**'s Martinsville, Ill., pipe line division, has been appointed division superintendent. He succeeds **Oscar M. Jaco,** who retired December 1 after 46 years with the company. Jaco started at the Martinsville tank farm and has since worked as a boiler cleaner, fireman, field gager, line foreman and engineer. In 1937 he became assistant superintendent and was promoted to division superintendent in 1938.

Smith first worked with Ohio Oil in 1916 and spent 16 years in Texas. He transferred to Martinsville in 1942 and became construction superintendent in 1951. A promotion to assistant division superintendent came to Smith in 1954.

•

**Wesley F. Wright,** vice president of **Lone Star Gas Company,** has retired after 44 years of continuous service with the company.

Wesley F. Wright

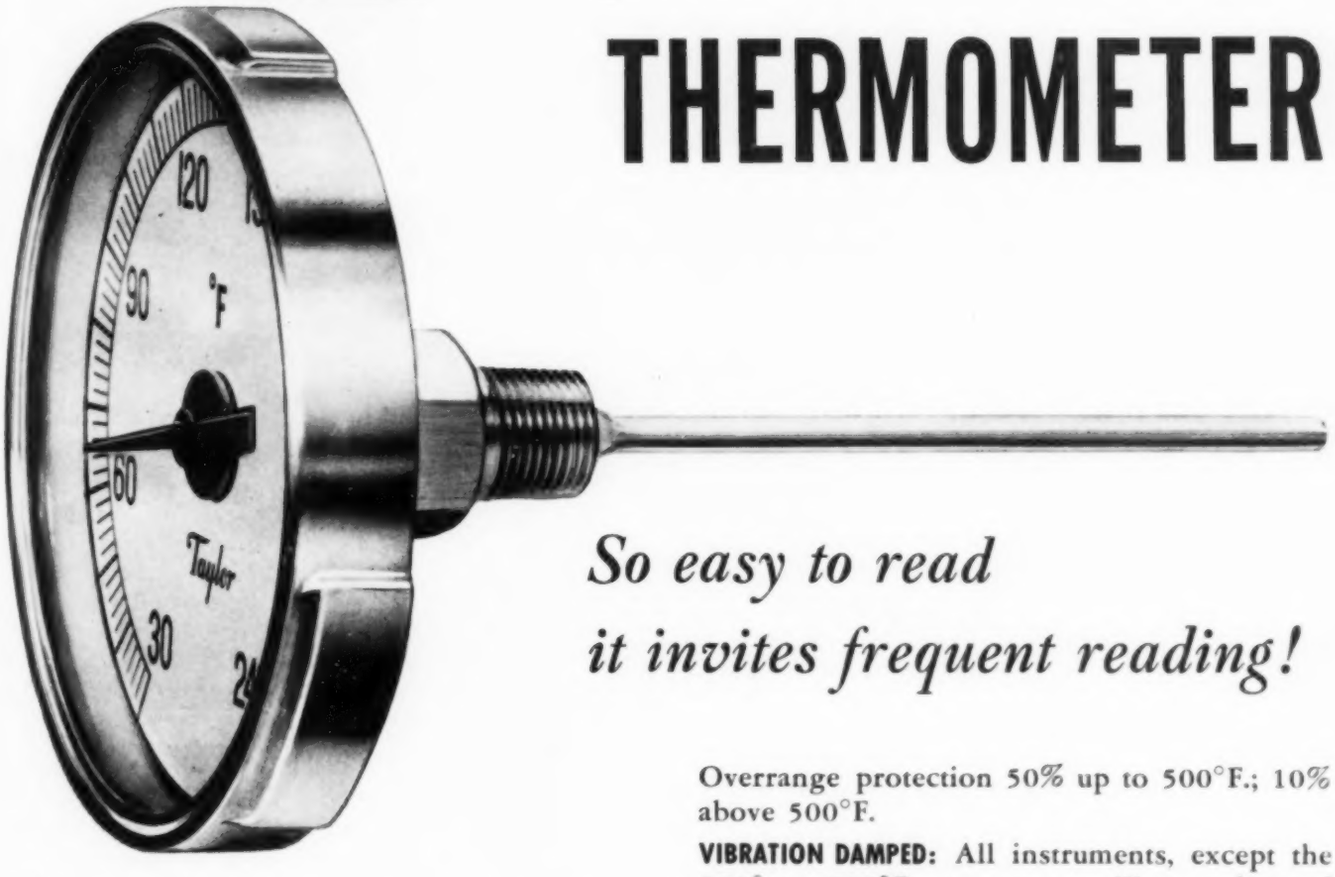
He began his gas industry career in 1911 with Dallas Gas Company, predecessor of Lone Star Gas Company's Dallas division of distribution. He was named general superintendent of Dallas Gas Company in 1921 and later was appointed general superintendent of Fort Worth Gas Company. He became vice president and operating manager of the Dallas Gas Company and County Gas Company in 1933 and became general manager of Lone Star's Dallas division of distribution in 1943. He has served as Lone Star's vice president since 1954.



For more data on advertised products, use Readers' Service Cards, last page

*Traditional Taylor accuracy in a low cost instrument*

# THE NEW BI-THERM* 5" DIAL THERMOMETER




*So easy to read*
*it invites frequent reading!*

A SIMPLE, dependable and economical thermometer with many applications throughout the petroleum field, such as, Heat Exchangers, Pipe Lines, Storage Tanks, Field Treaters. Wide variety of ranges from minus 40° to +750°F. Also available with three inch dial; stem lengths of 4, 6, 9, and 12 inches; separable wells of brass, steel, type 304 stainless steel or monel.

**EASY TO READ:** The large dials are highly readable because of black figures and graduations on an aluminum background.

**RUGGED:** All exposed metal parts are of arc welded, corrosion-resistant stainless steel. All instruments are waterproof. All mechanical connections are welded for greater reliability.

**ACCURATE:** These instruments are accurate within ±1% of range, over the entire range. Simple zero-setting features correct minor errors in readings which might result from severe mechanical shock. No ambient temperature effect. Overrange protection 50% up to 500°F.; 10% above 500°F.

**VIBRATION DAMPED:** All instruments, except the 200° to 750°F. range, are silicone damped against vibrations. Result is increased speed of response, no zero-shift due to shock, minimum pointer vibration, and elimination of pointer chatter when the thermometer is handled.

**ECONOMICAL:** Costs only **$16** to **$26,** depending on dial size and length of stem. Ask your Taylor Field Engineer, or write for **Bulletin 98267.** Taylor Instrument Companies, Rochester, N. Y., or Toronto, Canada.

*Trade Mark

*Taylor Instruments*
*MEAN*
*ACCURACY FIRST*
IN HOME AND INDUSTRY

**Sohio Pipe Line Company** has announced the appointment of **John F. Van Horn** as senior engineer of the company's Engineering division in St. Louis. A graduate of Carnegie Institute of Technology, Van Horn joined Sohio in 1954 in the General Engineering division of the Sohio Manufacturing department in Cleveland as senior engineer.

•

Three new members have been elected to the board of directors of **Southern Union Gas Company.** They are **Scott Hughes,** Dallas, first vice president of Southern Union; **Franklin W. Denius,** Austin, member of the law firm of Looney, Clark and Moorhead; and **John MacGuire,** El Paso rancher and contractor. At the same time **Willis L. Lea, Jr.,** Dallas, general attorney for Southern Union, was elected vice president of the company.

•

**R. R. McDaniel** has been appointed field superintendent of **Southern Pacific Pipe Lines, Inc.,** with headquarters in El Paso. **C. B. Miller** was named mechanical engineer in Los Angeles.

E. Clyde McGraw

Joe T. Dickerson

**E. Clyde McGraw** of Houston was elected executive vice president of **Transcontinental Gas Pipe Line Corporation** by the board of directors. McGraw has been Transco's vice president in charge of operations since joining the company July, 1950.

•

**Joe T. Dickerson** has taken over his duties as chairman of the six-state **Gulf Southwest District Oil Industry Information Committee.** Dickerson, president of Shell Pipe Line Corporation, succeeds **Roy M. Stephens,** Humble Oil & Refining Company sales official. Dickerson is a 28-year veteran with the Shell organization. As OIIC chairman, he will lead 4000 oil industry employes serving on six state, 72 area and 546 community committees.

•

**W. M. Wilson,** general superintendent of gas, natural gasoline and pipe line operations for **Lion Oil Company** at the El Dorado, Ark., headquarters, has been named manager of the southwestern region with headquarters at Midland, Texas. He replaces **F. H. McGuigan,** who has resigned. **Quinton Drake** will replace Wilson at the El Dorado office.


**Question to management...**

# *What is the real worth of Cathodic Protection?*

*The real worth of cathodic protection depends primarily upon its effectiveness after it is installed. Inadequately designed or improperly installed systems will not do the job. Savings on your corrosion control costs can best be obtained with experienced E. R. P. corrosion engineers working with your staff.*

*Successful cathodic protection requires careful investigation and correct interpretation of all factors affecting the corrosion of any buried or submerged structure. When you use Electro Rust-Proofing cathodic protection services, you are assured of a successful installation, for E. R. P. brings to each job a background of 20 years experience in survey, design and installation of cathodic protection systems.*

*Your inquiry—written now—will bring our engineers to discuss your corrosion control program—without obligation.*

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# So You Have an Important Stake in J&L Research

Every man who buys or uses or is interested in the use of A.P.I. Tubular Products can observe the results of J&L research.

It is reflected in the adaptability and useful life expectancy of every length of J&L pipe, seamless or welded.

It is reflected in the excellence of the technical services of J&L Supply Men actively and enthusiastically interested in helping you get maximum dividends from your pipe investments.

J&L PIPE

J&L STEEL

"...here's MY warehouse!"

*Jones & Laughlin*

SUPPLY DIVISION – Tulsa

SERVING THE UNITED STATES AND CANADA

3-1

**Texas Gas Transmission Corporation** has announced the election of **W. M. Elmer** as a director of the firm. Elmer is senior vice president of the company in charge of financing, sales, gas supply, production and regulatory matters. He is also president and a director of Texas Gas Exploration Corporation of Houston, production subsidiary of Texas Gas. He joined Texas Gas in 1947. **Ralph M. Thacker** of Owensboro, Ky., has been elected assistant secretary of Texas Gas.

**Charles E. Main** has been named chief engineer of the Eastern Pipelines division of **Socony Mobil Oil Company, Inc.** to succeed **George F. Brigance,** who retired. Main has been superintendent of the Product Pipe Line department, Central Pipe Line division in Topeka, Kansas. He has been associated with the Central Pipelines division for the past 20 years except for a short time in 1954 when he assisted in construction of a pipe line of Standard-Vacuum Oil in Australia.

**Elmo K. Ballard** has been appointed pipe line sales representative for **Deep Rock Oil Company** in the Chicago district. Ballard transfers from a sales position with Kerr-McGee Oil Industries, Inc., with whom he has been associated since 1954. Before his Deep Rock appointment, Ballard was on leave of absence to Valley States Oils, Inc., heading that company's Chicago office. In his new position he will handle the area bulk pipe line products produced and marketed by Deep Rock. Offices of Valley States Oils are under the supervision of K. U. Herbert and Ballard will continue to assist this affiliate company.

Elmo K. Ballard

•

**E. M. Kelley,** El Paso district manager of **Southern Union Gas Company,** has been promoted to southern division manager of the gas company's western properties. Kelley, whose headquarters will remain in El Paso, will supervise and assist in the operations of the company's southeastern New Mexico and West Texas districts in addition to his present supervision of the El Paso and Alamogordo districts. Kelley joined Southern Union 26 years ago and has served in various positions in Clovis and Portales, N. M., and in Rogers and Fayetteville, Ark., before becoming manager of the El Paso district.

E. M. Kelley

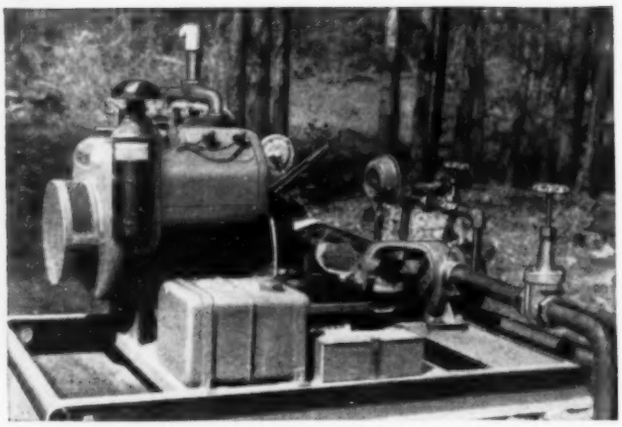
•

**Southern Pacific Pipe Lines, Inc.** has announced the following staff appointments: **Byron K. Smith,** assistant general manager; **William T. Eskew, Jr.,** chief engineer; **Murray A. Levy,** superintendent of products movements; **Elza T. Smith,** administrative assistant; **William F. Piles,** personnel manager; **Jess J. Smith,** general accountant; **John G. Montfort,** field superintendent, Colton; and **Robert B. McDaniel,** field superintendent, El Paso.


WISCONSIN Powered

**OIL FIELD UNIT**

**Pumps 30 bbls. per hr. at 600 lbs. pressure**



Pumping heavy viscous oil, this unit delivers about 30 bbls. per hour at 600 lbs. pressure. Dependable Lugging Power is supplied by an open type Wisconsin Model VF4D V-type 4-cylinder engine. It is operating in southern Oklahoma.

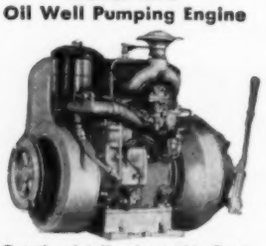
This Wisconsin engine is equipped with clutch reduction and operates on natural gas. Being of the "open" type, easier repairs and adjustments are greatly facilitated.

Weatherproof under the most severe conditions, this engine is ideally adapted to rugged, self-sufficient service in out-of-the-way locations and is rapidly becoming one of the most popular models in oil field service.

Heavy-duty construction features include tapered roller bearings at both ends of the crankshaft, high tension rotary type outside magneto with impulse coupling for easy starting at low cranking speed in any weather, Stellite-faced exhaust valves, positive type valve rotators and solid Stellite valve seat inserts for long engine life and minimum maintenance—plus extremely efficient AIR-COOLING even at high atmospheric temperatures.

You can't do better than to specify "Wisconsin Power" for your oil field units. Wisconsin Engines are available in complete power range from 3 to 36 hp.

**Model TFPD**
**Oil Well Pumping Engine**



Get the details about this 2-cylinder Wisconsin Oil Well Pumping Engine with built-in High Momentum Factor.

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World's Largest Builders of Heavy-Duty Air-Cooled Engines

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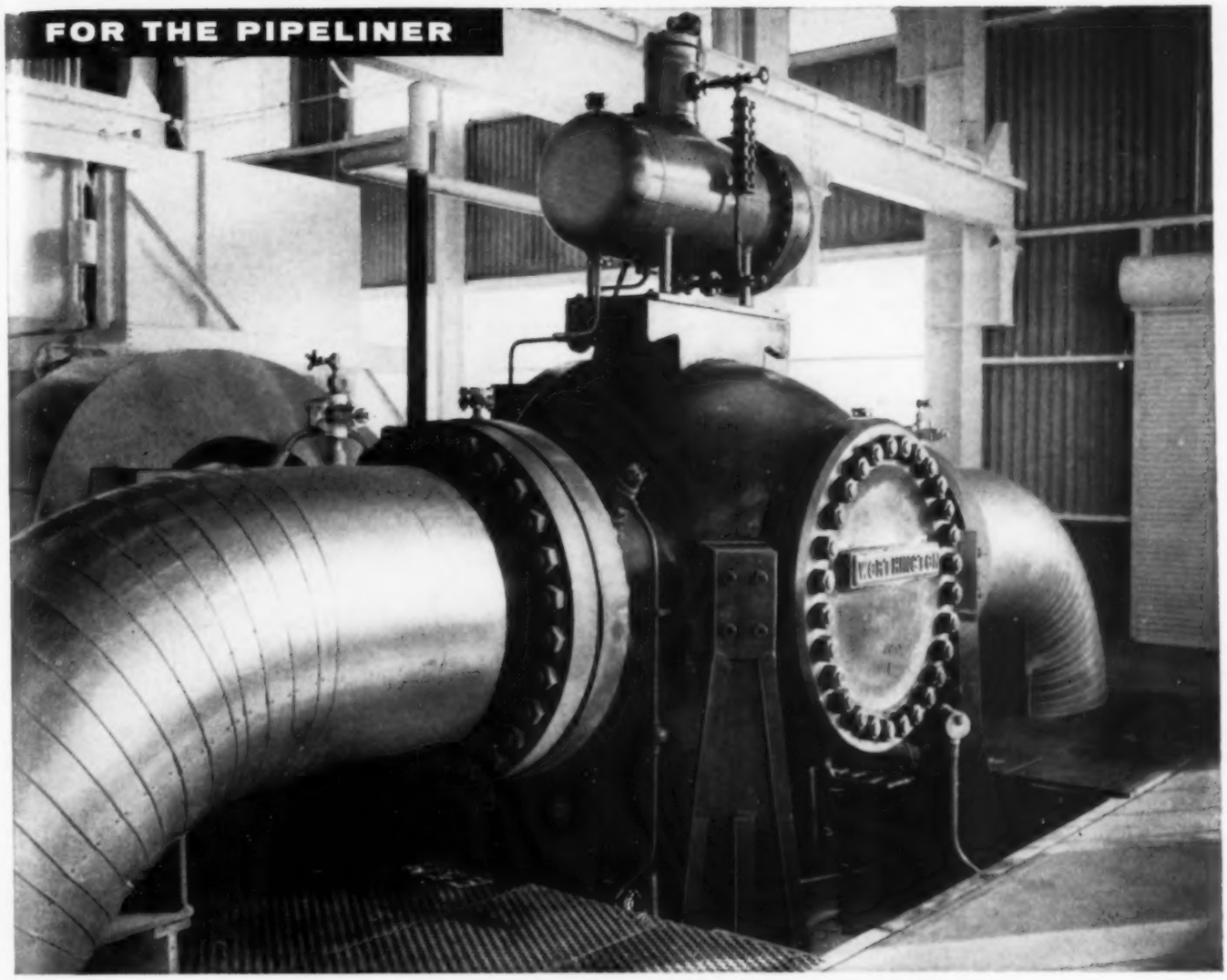
FOR THE PIPELINER



**WORTHINGTON GUP CENTRIFUGAL COMPRESSOR** installed in Northern Natural Gas Company's Compressor Station at Macksville, Kansas.

# New design concept combats shaft distortion, seal-oil leakage in new centrifugal compressor

New design features give Worthington's new GUP a headstart on other compressors for gas transmission pipeline service.

The GUP's main casing and support design minimize shaft centerline distortions arising from high pressure in the casing. Compressor casing is basically spherical with heavy pedestals providing centerline support. Shaft barrel support is carried on rear casing cover with no other external restraint.

Spherical casing design provides a cavity behind the impeller as a safeguard against accidental seal-oil leakage into gas stream. Seal design itself has had extensive service on this type of compressor.

Among other features is an integral lubrication and seal-oil system that's independent of the driver lubrication system. An emergency oil tank supplies the seal and lubricates the bearings in the event of pump failure. No internal bearing mishap can result in starving another bearing.

Result: a reliable single-stage, heavy-duty machine designed for the full range of gas transmission pipeline service. For details, request bulletin C1100B57, Worthington Corporation, Section EK.5.4, Harrison, New Jersey.

**WORTHINGTON**

***Economical, Continuous Power — Diesel, Dual-Fuel and Spark-Ignition Engines, from 200 to 5000 bhp.***

# UNION CENTRALIZED

*Progress Report*
*1955*

**To crude, product and natural gas pipelines**

# TRANSPORT CONTROL

**At the end of 1955, we had accumulated 25,000 miles of centralized control experience in long haul transportation.**

**In the pipeline industry, the assignments we have undertaken have been challenging and have made use of our extensive engineering knowledge in the control field. When competent control and pipeline engineers get their heads together and apply their many years of experience to the problems present, the results are bound to be good.**

**THEY HAVE BEEN!**

The solution of these control problems on a pipeline recognized the system approach. Not just one station —pump—or valve—but everything on the line was considered as an important and integral part of the system function. Because the prime objective was the fast and efficient movement c. liquids and gases over long distances, the complete operation was surveyed and analyzed where pipelines desired it.

Therefore, we have designed control systems for pipelines by applying our engineering philosophy that has been 75 years in the making.

Now in service, UNION systems are accomplishing the following:

1. Partial system control including:
   a. Coordinated control and indication of valves and pumps throughout the portion of the system under control.
   b. Coordinated control of valves determining stream destination at line switching center in the system.
2. Injection pump control and indication and metering.
3. Booster pump control and indication and metering.
4. Booster pump control and data handling.
5. On-the-line internal combustion engine driven gas compressor station control and indication including the remote control of governor set point and data handling.
6. Telemetering to indicate and record interface arrival at the switching center.
7. Alarm indications and automatic shut down of units caused by such faults as: (a) High pump outside bearing temperature. (b) High pump inside bearing temperature. (c) High pump case temperature. (d) High motor outside bearing temperature. (e) High motor inside bearing temperature. (f) High motor winding temperature.
8. Automatic sequencing of valve and pump functions.

The basic system features a high degree of flexibility. It works well over any communications medium: telephone circuits, carrier circuits, VHF and UHF radio and microwave, as well as private wire.

a. It is easily adaptable. The equipment is so constructed that additions or modifications can be made with a minimum investment. Clean and uncluttered, it is functionally designed to fit existing installations.
b. It is reliable. As one well-known pipeline engineer said, "it goes to work — and keeps on working."

UNION Centralized Transport Control can be used on a variety of pipeline layouts, gathering systems, tank farms and other applications requiring remote control. Let us show you *specifically* what it can do for you. Working on a specialist-to-specialist basis, we shall be glad to discuss your control problems. Write for complete information.

**GENERAL APPARATUS SALES**

## UNION SWITCH & SIGNAL

**DIVISION OF WESTINGHOUSE AIR BRAKE COMPANY**

**PITTSBURGH 18 PENNSYLVANIA**

# What's Happening

## AMONG SERVICE AND SUPPLY MEN

R. E. Nimtz

W. F. Gulley

### District Sales Managers Appointed by Rockwell

New appointments for two key West Coast sales officials have been announced by Rockwell Manufacturing Company's Meter and Valve division.

William F. Gulley, Seattle district sales manager since 1951, has been named San Francisco district manager. He is succeeded by Roy E. Nimtz, sales engineer in the San Francisco district for more than three years.

Gulley joined Rockwell as a sales engineer in 1947. Nimtz, a 1949 mechanical engineering graduate of the University of California, was a technical assistant with Pacific Gas and Electric Company before joining Rockwell in 1952.

### Smith Named Vice President Of Colorado Fuel & Iron Division

Hubert C. Smith has been elected vice president in charge of operations of the Eastern division of The Colorado Fuel and Iron Corporation.

Smith will assume supervision of operations in the Eastern division of The Colorado Fuel and Iron Corporation and will make his headquarters at Claymont, Del.

### Pacific Coast Borax Company Announces Personnel Changes

Pacific Coast Borax Company, division of Borax Consolidated, Limited, has announced personnel changes in the Agricultural sales division. F. T. Winters, Jr., has been appointed special advisor on herbicide sales to the parent company, Borax Consolidated, Limited in London.

Dr. L. M. Stahler has been appointed manager of the agricultural sales division and will direct activities of that sales organization throughout the U. S. Dale Rake has been appointed director of agricultural research and development which position was formerly held by Dr. Stahler.

### Fisher Governor Company Moves Into New Research Center

Fisher Governor Company, Marshalltown, Iowa, has moved into its recently-completed research and engineering center. The new three-story brick structure has 100,000 square feet of space and is completely air-conditioned. It covers approximately half of a square block and about 200 of Fisher's 1250 employes are assigned to the building.

The new facilities make possible better coordination and expanded engineering and research activities. Performance tests can now be run on Fisher control equipment at pressures up to 2500 psi, using air or water as flowing medium. A series of test lines up to 12-inch diameter are located in the acoustically-treated laboratory.

### Blair-Martin to Represent Anderson, Greenwood & Co.

Anderson, Greenwood and Company recently has appointed Blair-Martin Company, Inc., of South Pasadena, Calif., as exclusive representative in California and Arizona.

Frederick D. Blair, president, formerly was regional sales manager of Aerol Company, Inc., a subsidiary of Lockheed Aircraft. Walter S. Martin, secretary-treasurer, formerly was chief sales engineer of the same company and William B. Morgan, vice president, has served as sales engineer with Robert H. Brown Company of Los Angeles and Aerol Company, Inc., before his present association.

### John C. McCauley Joins Hammond Iron Works Staff

The appointment of John C. McCauley to the sales engineering staff of Hammond Iron Works has been announced.

John C. McCauley

McCauley, who has been identified with the metal fabricating industry for the past 11 years, will make his headquarters in New York City. His services will be available to the petrochemical and processing industries to which Hammond Iron Works is a major supplier of tankage, processing vessels and general steel plate construction.

### Conoflow Corporation Merges With Walworth Company

An exchange-of-stock agreement between Conoflow Corporation and the Walworth Company has been announced. Effective January 3, 1956, Conoflow becomes an operating subsidiary of Walworth Company.

Conoflow Corporation, founded in 1943, is a manufacturer of final control elements, including automatic control valves, pneumatic power operators and air regulation equipment. The merger will provide Conoflow with a broader financial base to expand research and development activities, increase inventory and acquire additional manufacturing facilities. As an independent subsidiary, Conoflow will operate under the same policies as in the past, with no change in management or personnel. Conoflow will retain its existing plant in Philadelphia.

Walworth will experience more diversification into the field of automation used in the process industries, the power industry and atomic energy development.

### Dr. Ernest Keller Appointed Panellit Research Director

The appointment of Dr. Ernest A. Keller as director of research has been announced by Panellit, Inc. He will lead Panellit's research program which includes development projects in data handling, automation and computer technology.

Ernest A. Keller

A native of Switzerland, Dr. Keller came to the U. S. in 1950 as a technical executive to evaluate markets for Oerlikon Machine Tool Works, Zurich. Later he joined Daystrom Electric Corporation, Poughkeepsie, N. Y., as physicist in charge of tape recorder development and high fidelity sound equipment.

In 1941 Keller built Switzerland's first digital computer and two years later constructed Ipsophone, the world's first fully-automatic telephone answering device.

### Price and Adams Fill Posts With General Electric

The appointment of S. S. Price and A. H. Adams to two newly-established engineering posts in the Distribution Assemblies department of the General Electric Company has been announced.

Price has been appointed manager-panelboard and motor control design engineering. Adams has been made manager-switchboard and distribution center design engineering.

In his new assignment, Price will be responsible for all product design activities connected with the department's line of panelboards and motor control centers. He joined the company in 1953 and was formerly cost reduction specialist for the department.

Adams will be responsible for product design activities connected with the department's line of switchboards and sectional type unit substations. He has been with General Electric since 1945. Prior to joining the Distribution Assemblies department, he was a product engineer specializing in industrial control equipment at Schenectady, N. Y.

### Gibson Named Representative For Jones & Laughlin Steel

Joe B. Gibson, of Library, Penn., (Pittsburgh) has been appointed special representative—line pipe projects in the Tubular Products division of Jones & Laughlin Steel Corporation.

Gibson was graduated from Oklahoma A&M University in 1949 with the degree of bachelor of science in business administration. From 1949 until his present appointment, he was employed by the Jones & Laughlin Supply Division in various capacities, including storeman in Shreveport, La.; store manager in Haynesville, La.; field salesman, El Dorado, Ark.; and sales office manager in Chicago.

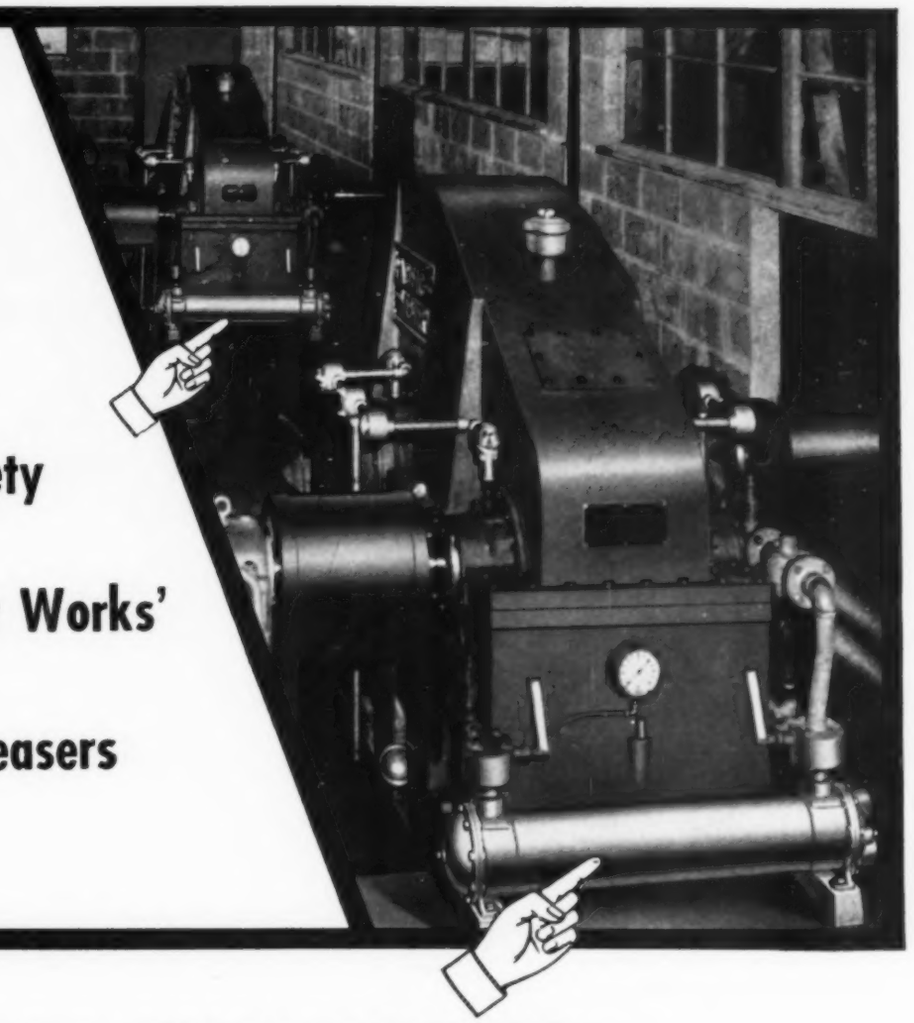
for

continuous

temperature safety

in Western Gear Works'

giant speed increasers



# ROSS EXCHANGERS

Quiet dependability under heavy-duty continuous load — in the words of the manufacturer — has built widespread preference for Western Gear Works' high speed gear units.

For continuous temperature safety of gears and bearings, Type C Speed Increasers (shown) — *the largest ever built in the U. S.* — are Ross Exchanger equipped. In fact *all* present Western Gear Works' Speed Increasers are Ross Exchanger equipped. Ample supplies of properly cooled lube oil are thereby provided at all times. Heat generated by power transmission is effectively carried away.

Just as Ross Exchangers are preferred for major equipment serving pipelines, so are they also preferred throughout the oil and gas industry: for engines, compressors, turbines, hydraulic machinery, centrifugal pumps, torque converters and trucks.

Repeatedly chosen for their rugged dependability, as well as their thermal efficiency, all copper and copper alloy Ross Type BCF Exchangers are completely pre-engineered, fully standardized and *promptly* available to meet most requirements. For complete information, request Bulletin 1.1K5.

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EXCHANGERS

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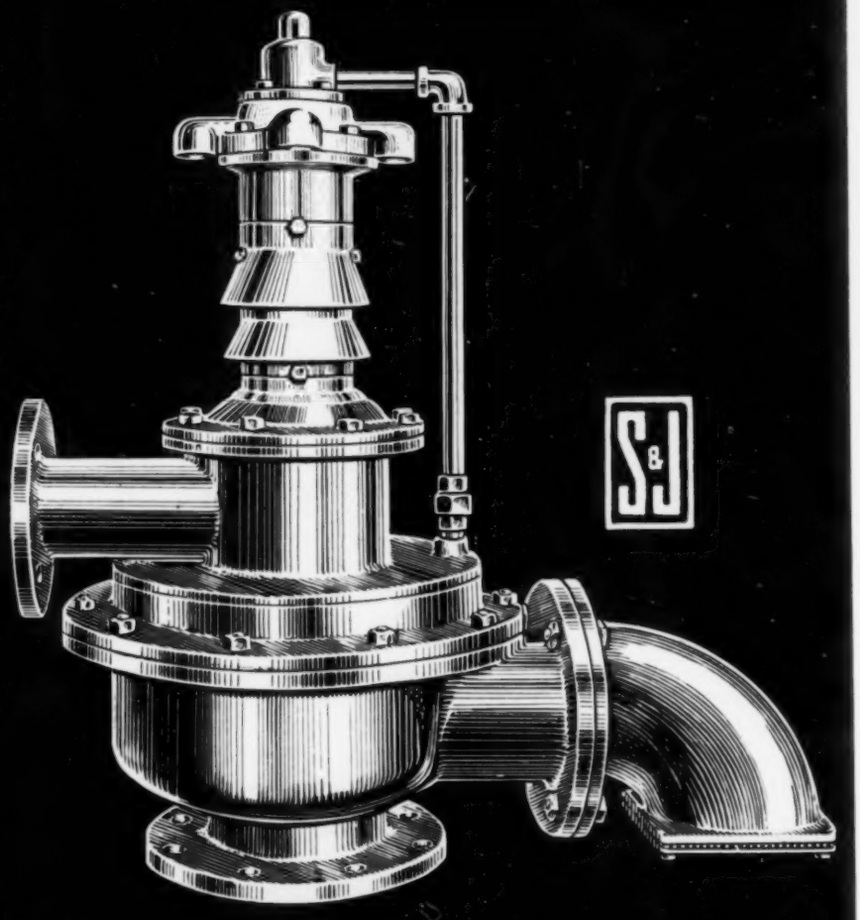
A TRULY efficient safety relief valve for pressure storage tanks must remain tightly closed at all pressures within the working range, yet must open without fail whenever internal tank pressure tends to exceed the working limit. The Shand & Jurs Pilot Operated Safety Valves meet these specifications to a "T." They provide the important insurance against property damage and personnel hazards caused by failures due to excessive internal tank pressures.

The S&J Pilot Operated Safety Valve, Fig. ST-5000, incorporates a special seal on the main valve pallet preventing any leakage prior to full opening. It operates exactly at the set pressure with a minimum of blowdown, requiring no accumulation of pressure above this setting for full opening. A special "peeling action" on valve seating surfaces minimizes interference by freezing or sticky foreign substances. Should the diaphragms be damaged or ruptured, the valve will continue to operate at a lower pressure. Available in 4" and 6" sizes for pressure ranges of 1 to 10 pounds.

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CHICAGO
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LOS ANGELES
6399 Wilshire Blvd.

REPRESENTATIVES:
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MONTREAL: Lytle Engineering Specialties, Ltd., 360 Notre Dame St., W.
TORONTO: Lytle Engineering Specialties, Ltd., 85 Richmond St., W.
VANCOUVER: P. D. McLaren & Son, Ltd., 3277 Main Street
CARACAS: Sinclair Spence, C.A., Edificio Galipan
ENGLAND: Whessoe, Ltd., Sales: 25 Victoria St., London, S.W. 1
Whessoe, Ltd., Works: Darlington, County Durham

F. H. Hayes

E. G. Hotze

### Clark Bros. Co. Announces Changes in Houston Office

Clark Bros. Co. has announced the retirement of F. H. Hayes, vice president and district manager of the Houston territory, and the appointment of E. G. Hotze to succeed Hayes as district manager.

Hayes has been associated with Clark since 1935 when he opened the company's Houston office. He will continue to reside in Houston.

Hotze's career in the oil and gas industry began in 1935 when he joined Cities Service Oil Company in Oklahoma City. He came with Clark Bros. in 1942 as sales engineer and was named assistant manager of the Houston district territory in 1952.

### Harmison Receives Promotion By Allis-Chalmers Manufacturing

J. D. Harmison is now manager, parts sales, for the Tractor group, Allis-Chalmers Manufacturing Company. He has been tractor sales manager, Farm Equipment division, since October, 1952.

J. D. Harmison

Harmison joined the company at the Peoria, Ill., branch in 1939, and was located at Peoria until being transferred to the home office in Milwaukee in 1951.

Prior to coming with the company he was with the Allis-Chalmers dealer at Havana, Ill., and was in the automotive parts business in Peoria.

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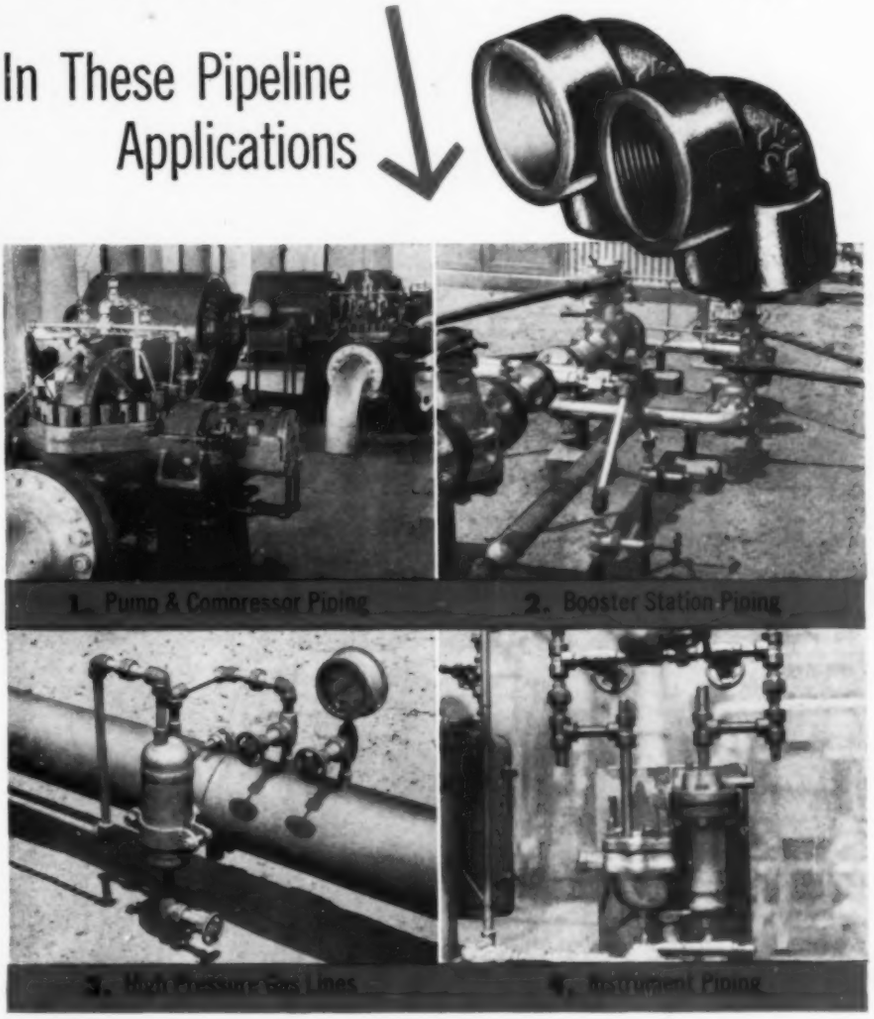
In These Pipeline Applications




Watson-Stillman Forged Steel Fittings provide safe, tight connections for your small diameter, high pressure piping ... give you full protection against costly shutdown. Drop-forged of high strength steel for maximum resistance to pressure, shock and vibration, W-S fittings can be obtained in both screw-end and socket-welding types, sizes ⅛" to 4" I.P.S.

Fittings are available in carbon steel, stainless steels and alloy steels to meet a wide range of service conditions. Screw-end type in 2000, 3000 and 6000 lb. WOG class; socket-welding type for schedule 40, 80, 160 and XX pipe. We also manufacture a line of 150 lb. stainless steel fittings for corrosive, low pressure service.

Send today for our up-to-date technical catalogs.

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**WATSON-STILLMAN FITTINGS DIVISION**

**H. K. PORTER COMPANY, INC.**

**Roselle, N. J.**




For more data on advertised products, use Readers' Service Cards, last page.

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ELIMINATE LARGE WAREHOUSE STOCKS

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**DESCO**
PLUG VALVE
**LUBRICANTS**
***ARE ALL YOU NEED***
no matter what passes thru your valves!

No matter what the fluid or its temperature, Desco Lubricants are guaranteed to STAY in your valves . . . and 4 types are all you need.

Desco Lubricants will not harden or coke-up because they are ALL lubricant and contain no inert material.

**CONVENIENT STICKS OR BULK**
Packed in clean, convenient sticks in 5 sizes for gun or jack screw. Also in 5-quart, 5-gallon, and 100 lb. bulk containers.

*The Only Complete Plug Valve Lubrication Company*

**DELTA ENGINEERING SALES CO.**
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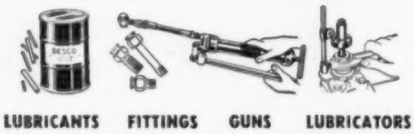
*Sales Offices in All Principal Cities*

**DELTA-DESCO**
PLUG VALVE
**LUBRICANTS**
**AND EQUIPMENT**



LUBRICANTS FITTINGS GUNS LUBRICATORS

***Tube-Kote Engineers Win Mexico Trip***

**Exceptional sales during the 1955 fiscal year earned these seven Tube-Kote, Inc. employes and their wives an all-expense trip to Mexico City. Front row, left to right, are Mr. and Mrs. Gerald Beard of Victoria; Mr. and Mrs. Grady Howell, Shreveport; Mrs. Kerby and Charles Kerby, Lafayette. Back row, Mr. and Mrs. William Borton, Midland; Mrs. Edgar and L. C. Edgar, Highlands; Mrs. Ramey and William Ramey, Tulsa; and Mrs. Sandelius and Ted Sandelius, Houston.**

### American-Standard Forms Ross Heat Exchanger Division

The formation of the Ross Heat Exchanger division of American Radiator & Standard Sanitary Corporation with headquarters in Buffalo has been announced by American-Standard.

The new division will conduct operations in the heat exchanger field formerly carried on by Kewanee-Ross Corporation. Kewanee-Ross is being dissolved in accordance with the policy of divisionalizing American-Standard activities along major product lines, Joseph A. Grazier, president of American-Standard, said. At the same time, the Kewanee Boiler division is being established to conduct the steel boiler activities of the dissolved company.

Officers of the new Ross Heat Exchanger division are John C. Linsenmeyer, president; Richard S. Reade, executive vice president; John W. Gudgel, vice president—sales and marketing; and Townsend Tinker, vice president—engineering, research and development.

Linsenmeyer is president of American Blower Corporation, also a division of American-Standard, and will continue to serve in that capacity. Reade has been director of purchases for the Plumbing and Heating Division of American-Standard.

### Le Roi Expands Operations With New Plant in Tulsa

Le Roi Division, Westinghouse Air Brake Company, has announced the completion of a new plant in Tulsa which expands the firm's facilities for serving the petroleum and construction industries.

In the new plant a complete line of Le Roi gas booster compressors and Le Roi air drilling compressors will be engineered, fabricated and assembled. The plant also modifies basic Le Roi engines to conform with customer specifications and requirements. In addition to offices for regional sales and petroleum industry headquarters, the plant includes a replacement parts store and a warehouse.

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No change except the corporate name. We still have the same ownership, same management, same address, same telephone, and use the same 45 years of experience to render the same service under the same trade name—"PELCO."

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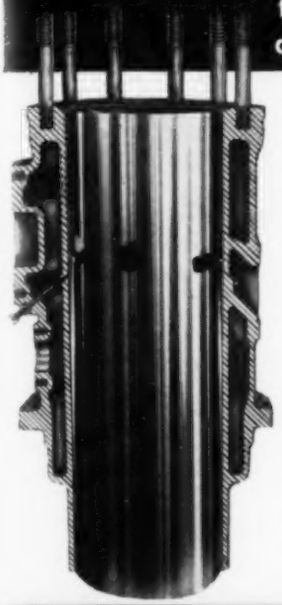
for ALL ENGINES
and COMPRESSORS!



NILINED Cylinders are not merely "lined" or "sleeved," but are tailored in every detail to the most exacting requirements. Each is fitted with a thin-wall liner of NIMCOLOY, a controlled process cast iron designed to insure the ultimate in wear-resistance and anti-scoring qualities. In every step of the rehabilitation process, skilled machinists and specialized machines combine to give you cylinders that will give longer, more trouble-free service than NEW cylinders!

Many types of cylinders are available on an exchange basis.

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Jack H. Walters

R. B. Kitzmiller

T. O. Carson

M. F. Groom

## Sales Personnel Changes Announced by Rockwell

Four key sales personnel changes at national headquarters of Rockwell Manufacturing Company's Meter and Valve division have been announced.

Jack H. Walters, gas products manager for the past year, has been named manager of gasoline and oil products. Robert B. Kitzmiller, San Francisco district sales manager since 1952, has been named gas products manager.

T. O. Carson, assistant products manager, Nordstrom valves, has assumed the additional responsibility of manager of distributor sales; and M. F. Groom, a sales engineer from the Houston district, has been named assistant manager of distributor sales. All four will make their headquarters in Pittsburgh.

Walters, a native of Shepherd, Texas, joined Rockwell in 1945 as a sales engineer in Louisiana. He became Houston district gas products supervisor in 1948, and Houston district sales manager in 1951.

Kitzmiller joined Rockwell in 1934 as a production clerk, moved to the Pacific Northwest as a sales engineer in 1945, became San Francisco branch sales office manager in 1951.

Carson was employed by Rockwell's International division as a sales engineer in 1945 and managed the division from 1949 to 1954; Groom joined the company in 1946 as a sales engineer in New Orleans.

## Emsco Manufacturing Announces Appointment of Jack Bechtold

Emsco Manufacturing Company has announced the appointment of Jack R. Bechtold to head its mast and drilling structural sales.

Jack R. Bechtold

For the past 6½ years Bechtold has been working in design and sales with the Lee C. Moore Corporation of Tulsa. A graduate of Oklahoma A & M, Bechtold had three years of roughnecking experience. As manager of mast and drilling structural sales, he will have headquarters in the Dallas office.

## Westinghouse Appoints Edney Project Manager

Edward O. Edney, Jr., has been appointed project manager for the nuclear power program of the Westinghouse Electric Corporation's steam division, South Philadelphia, Penn.

Formerly a steam application engineer, Edney joined Westinghouse in Birmingham, Ala., in 1945 as a member of the company's graduate student training program. He served a short time at the East Pittsburgh Works before coming to South Philadelphia in 1946 where he joined the steam division's Sales department. Since 1952, he has held the position of order service manager for the division.

## Van Tassel Named Designer For Joy Manufacturing

Robert M. Van Tassel has been appointed head industrial designer for Joy Manufacturing Company, attached to the Pittsburgh executive staff.

Van Tassel has been with Joy seven years and prior to that was engaged in product development and design for the Cadillac division of General Motors. In his new capacity he will stimulate styling advances on new and existing products.

## C. Lee Cook Elects Barnes Vice President-Sales Manager

The election of William H. Barnes as vice president and general sales manager of the C. Lee Cook Company, has been announced.

William H. Barnes

Before joining C. Lee Cook, Barnes had been associated for ten years with Clark Brothers Company in Tulsa. For the past 2½ years he was district manager of Clark Brothers' Tulsa district. He previously had been with the Standard Oil Company of Indiana, and the Standolind Oil and Gas Company.

## Jones & Laughlin Supply Sales Office Has New Quarters

Moving of the Jones & Laughlin Supply Division sales office from the Fidelity Union Life building to larger quarters in the Republic National Bank building has been announced. The newly-constructed $25 million, 40-story Republic building is located on Pacific at Ervay.

The Supply division maintains quarters in a 1600-square-foot area on the sixteenth floor in conjunction with its parent corporation, the Jones & Laughlin Steel Corporation. Sales personnel headquartered in the new office are Guy A. McDaniel, sales office manager; Frank J. Kopp, general salesman; Frank B. Barnett, salesman; and A. W. Hail, salesman, J & L Products.


See Composite and Refinery Catalogs, or Write for Specifications Folder

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Nozzle sizes from ¼" to 24"

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Nominal pipe sizes 1" to 30"

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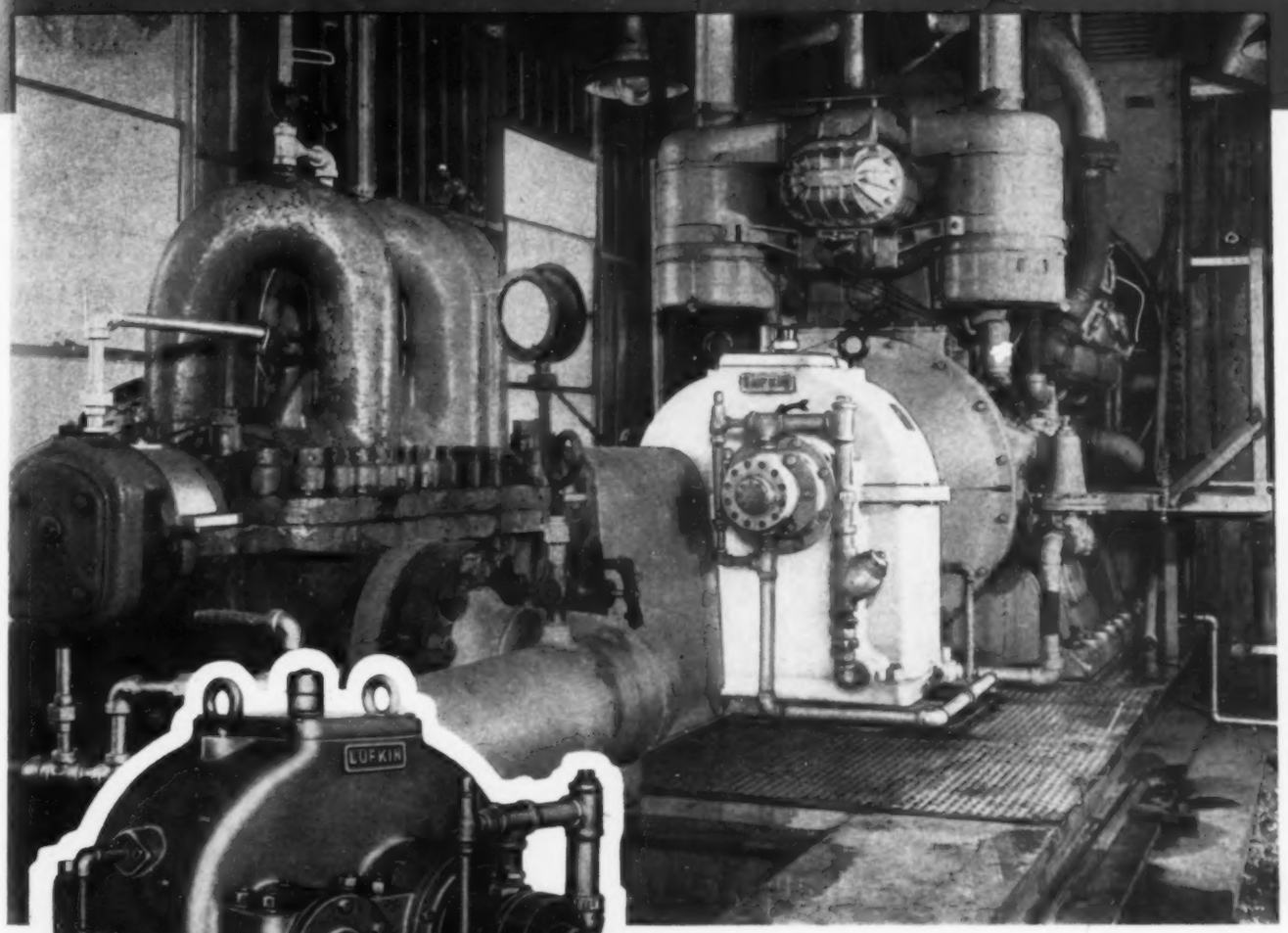
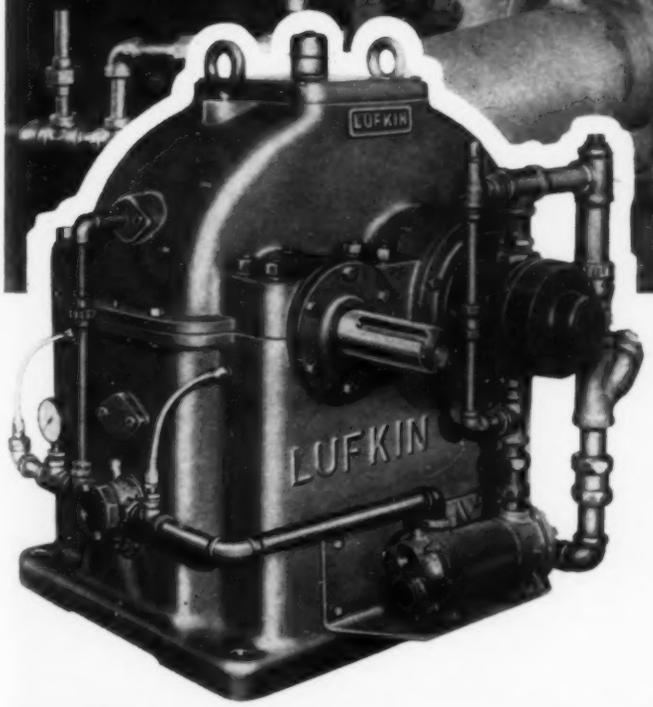
# LUFKIN Precision Gears

GUARANTEE THE UNINTERRUPTED TRANSMISSION OF POWER SO NECESSARY FOR THE UNINTERRUPTED TRANSMISSION OF OIL



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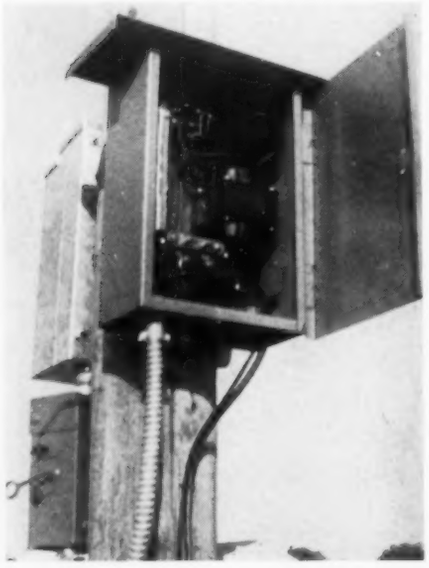
# What's New in Equipment

## for the Pipe Line Industry



### Corrosion Rectifier

An all-new, small corrosion rectifier for low-cost corrosion protection of oil field installation where low amperage requirements are indicated has been developed by Corrosion Rectifying Company.

Called the "Sentinel, Jr.," the rectifier is applicable for corrosion protection of oil well casing, short oil, gas or water pipe lines, heat exchangers, bulk tanks, hydraulic lifts and for any buried or submerged metal structures where requirements for ample corrosion protection are small, and where economy is dictated.

Featuring simplicity of design and operation, this new unit is of oil field-type construction. Transformer and rectifier plates are housed in a metal case which is mounted on the same pole with the power meter and switch. Completely equipped, this new unit is available in 110/220/440 volts AC, 12 to 48 volts DC, and 3 to 6 amperes DC sizes.

For more data circle **No. E1** on Readers' Service Card, last page this issue.

### Corrosion Control Method

A new corrosion control method especially designed for stopping corrosion of submerged metal surfaces in fire protection water storage tanks has been developed by the Electro Rust-Proofing Corp. (N. J.)

The system combines cathodic protection with chemical treatment consisting of addition of specific non-oxidizing salts or collodial substances to the water. This treatment greatly reduces initial installation cost and operating expense of cathodic protection. It also assures a better and more consistent distribution of protective current to all submerged metal surfaces in the storage tank.

For more data circle **No. E2** on Readers' Service Card, last page this issue.

### Hydro-Electric Tower

Safway Steel Products, Inc., has devised a hydro-electric elevating work tower for one-man use. Powered by a ¾-horsepower single phase electric motor, the Moto-Lift can be plugged into any 110-volt a-c outlet. The motor operates a hydraulic pump to raise the work platform from 7 feet to 17 feet above the floor in 25 seconds. Working capacity is 400 pounds.

The plug-in tower has a 50-foot, heavy duty extension cable, permitting work along a 100-foot strip before moving to another outlet. Of all-steel construction, the 4-legged 61 by 61-inch base provides rigid and stable support. The 30 by 30-inch work platform is made of heavy metal plate. Supports from the tubular base to each corner support off-center loads without tilting or weaving. A removable steel ladder provides access to the platform when fully retracted. Guard rails are 40 inches high.

For more Data Circle **No. E3** on Readers' Service Card, last page this issue.

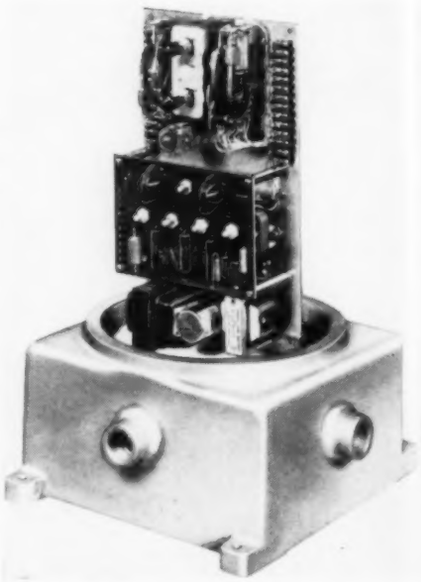
### Model Piping Kit

Barco Manufacturing Co. now has scale model kits to demonstrate arrangements that can be worked out using Barco swing joints and flexible ball joints to provide flexibility in piping. In actual practice, these models have helped engineers visualize design arrangements, work out movement problems and check capabilities, limitations and clearances.

The kit includes a selection of straight and angle joints, along with various lengths of "piping" and a base for mounting. The parts fit together without tools and demonstrate the 360-degree swing of both joints, plus the 30-degree to 40-degree angular flexing of the ball joints.

(This item supplements Barco Manufacturing Company data on Page 601 of the Composite Catalog, 21st Edition.)

For more data circle **No. E4** on Readers' Service Card, last page this issue.



### Temperature Reading System

Remote temperature reading has been added to the Shand & Jurs telepulse system of remote tank gaging. This new remote temperature reading system can be installed as a separate, complete system for remote temperature reading or in conjunction with S&J's telepulse system for remote liquid level gaging.

It gives accurate, remote temperature reading from any point communication facilities can or do reach. When added to existing telepulse remote gaging system, the new system requires a minimum of additional local lines, and shares some existing ones.

The system provides measurements in various temperature ranges covering ambient or elevated temperatures, or both. Normal span of reading is 130° F., with readings to the nearest degree. Broader spans may be obtained in double and triple this amount, with indication to the nearest 2 degrees or 3 degrees respectively, depending on type of measuring element at the transmitter. Top limit of temperature measurement may be as high as 500° F. Shown is the remote temperature transmitter for the system.

For more data circle **No. E5** on Readers' Service Card, last page this issue.

### Pressure Gage

A pressure gage for determining available air pressure at point of use has been brought out by U. S. Gauge, a division of American Machine and Metals, Inc.

The 2-inch diameter gage is finished in chrome and comes equipped with a hypodermic needle and guard. It permits tapping the air hose at the tool, thus determining pressure available at the tool regardless of original pressure or number of tools on the line.

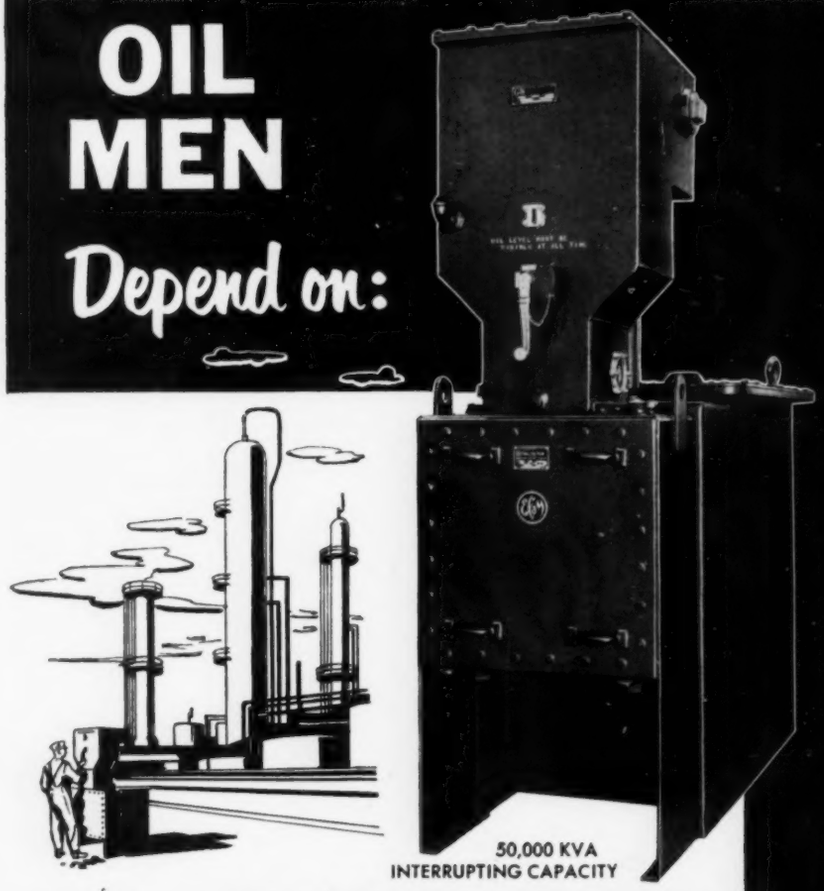
For more data circle **No. E6** on Readers' Service Card, last page this issue.

***Save time! Keep informed! Circle numbers on Readers' Service Cards, last page this issue***

**FIVE OUT OF SEVEN** pipeline contractors on the 561-mile Transco 30″-36″ superinch line use Cleveland Trenchers. On this big job of oversize trench for Transco, these Cleveland 320's consistently produced high daily footage—day in and day out. Because of their outstanding maneuverability and versatility, these same "320's" are also employed efficiently and profitably on smaller diameter pipelines—paying *extra* dividends on the equipment investment.

THE CLEVELAND TRENCHER COMPANY, 20100 St. Clair Avenue, Cleveland 17, Ohio

# OIL MEN Depend on:



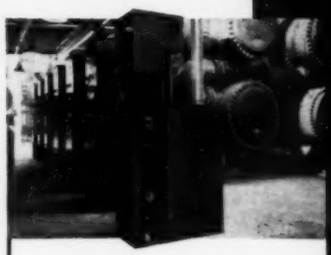
50,000 KVA
INTERRUPTING CAPACITY

# EC&M 2200-5000 VOLT Motor Starters

These EC&M Div. 1 combination Starters for Class I, Group D locations give refinery engineers and construction and design companies top value. They require less floor space . . . line, motor and control leads are brought to conduit connection box for quick installation . . . and high interrupting capacity is inherent . . . 50,000 KVA, and no fuses required.

Oil disconnect switch (on top) may be locked open or closed . . . view windows on both sides show switch contacts. Rear oil-tank has potential transformer for 220-volt push button circuit. Type ZHS (50,000 KVA) Magnetic Contactor may be raised above oil for inspection without disconnecting any bolts or leads.

Before buying, investigate EC&M Combination Starters . . . they provide economy in installation, operation and maintenance . . . and they're complete in every respect.



**ADVANTAGES of this Battery of EC&M Starters in a refinery.**

1. Combination Starter with self-contained Oil Disconnect Switch
2. All internal wiring complete . . . leads brought to conduit box for easy connection to power and motor leads
3. Heavy duty contactor has alloy contacts
4. Slender design reduces floor space
5. Thermal-Magnetic Overload Relays give accurate motor protection . . . trip instantly on faults
6. Simple 3-wire time-delay UVP push button circuit

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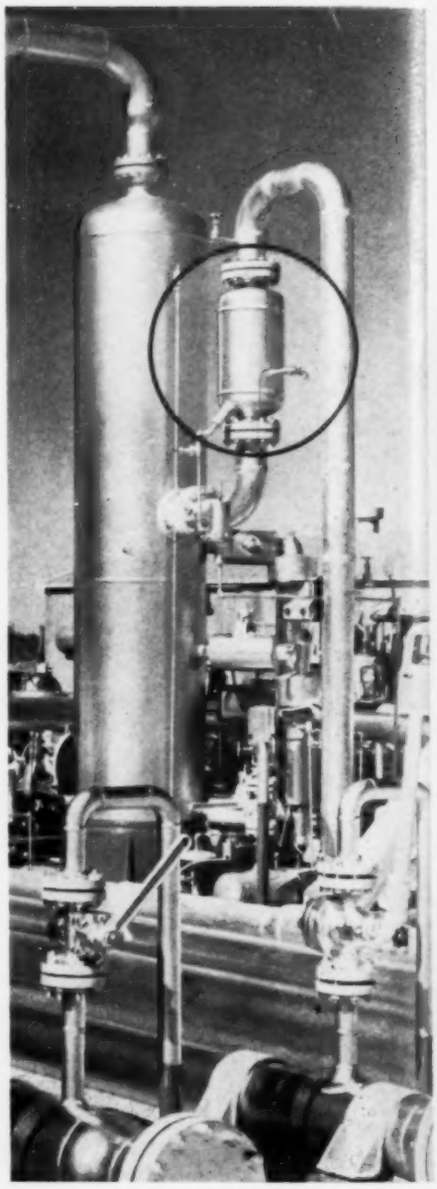
## NEW EQUIPMENT . . .



### Purifier

A new low-cost Purifier has been developed by the V. D. Anderson Company for use in gas scrubbing. It is said to recover virtually 100 percent of the recoverable liquid present in natural gas, at a saving in capital investment of up to 500 percent over conventional tank-type gas scrubbers.

The purifier separates all liquid and mist entrainment from butane, methane, propane and other hydrocarbon gases by means of a two-stage principle of separation. The first stage employs carefully controlled impingement against a baffle which removes larger droplets of entrainment from the gas. In the second stage of separation, the purifier removes the fine mist entrainment by utilizing controlled centrifugal action. In each stage natural gasoline and liquid entrainment is carefully and continuously guided for maximum separating efficiency. This factor eliminates any possibility of carry-over under normal operating conditions.

The purifiers are extremely compact in size. The 6-inch size shown is only 34 inches long and 16 inches in diameter. For more data circle **No. E7** on Readers' Service Card, last page this issue.

# A CAT* TWIN ARC-WELDER JOINS THE FIRING LINE

## *for Oklahoma Pipe Line Constructors*

Oklahoma Pipe Line Constructors put its new Caterpillar D315 Twin Arc-Welder to work immediately on a 24" line it is laying for Tennessee Gas and Transmission Co. into the northeastern states.

The great new arc-welder—which combines a powerful Cat D315 Engine with two welding generators mounted in one generator frame—is mounted on an Athey crawler pulled by a D6. Reports Superintendent N. L. Arie:

"We like Caterpillar equipment because we have found it best over the years. Cat-built equipment takes more rough treatment in tough places than any other."

And the new twin arc-welder is no exception. It is heavy-duty power in a compact package—easily transported over rugged terrain. The unit is only 30" wide and 10′ long. Each of the two generators has an output of 300 amperes, but when extra-heavy current is required, they are paralleled to produce 600 amperes. Independent controls allow operators to weld at different voltages at the same time.

Welders like the smooth arc with its excellent metal flow. And you can be sure your firing line will keep up with the pipe. This 4-cycle diesel picks up the load instantly without missing.

Here's a way to cut transportation and maintenance costs and conserve manpower. You'll start saving money the day you begin using the new twin arc-welder on your spread. For complete details, see your nearby Caterpillar Dealer soon.

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

**CATERPILLAR***

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Chicago-Wilcox understands the gasket requirements of pipeliners and is equipped to supply all types of gaskets including plain and double jacketed corrugated metal gaskets as pictured, compressed asbestos, vulcanized hard fibre, rubber, and all other materials in all sizes and shapes.

**Send specifications for quotations and prompt-delivery schedule.**

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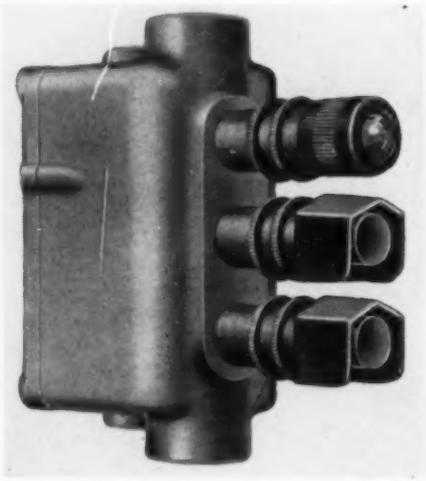
## Sidebooms

A complete line of sidebooms matching International Harvester's new line of tractors has been announced by Superior Equipment Company. The series consists of six models — from the PBI-9A to the PBI-241BH — designed for the TD-24 to TD-9 International Harvester tractors.

New features are the bottom hinged, hydraulic, extendable counter-weights operated by a combination pump and valve tank unit. Former lifting capacity range was between 16,000 pounds and 92,000 pounds; upper limit now is 110,000 pounds capacity on the PBI-241BH at four-foot radius. Also, operating levers have been changed from vertical to horizontal position, tieing in with features on the new IH tractors.

(This item supplements The Superior Equipment Company data on Pages 4788-4791 of the Composite Catalog, 21st Edition.)

For more data circle **No. E8** on Readers' Service Card, last page this issue.



## Miniature Receivers

Miniaturized metameter telemeter receivers, which can be used in graphic panel arrangements, have been announced by The Bristol Company. Available either as indicators or strip-chart recorders, they occupy a panel space only five inches square.

Designed to fit into the company's metagraphic instrument line, the indicators and recorders can be used to receive telemetered signals of any of the usual variables, such as pressure, flow, temperature and differential pressure, and such electrical measurements as voltage, current and power. Identical in appearance to the standard Bristol metagraphic pneumatic transmission instruments for short distance transmission of measurements, they provide a uniform appearance in a graphic panel presentation as well as in conventional instrument panel arrangements.

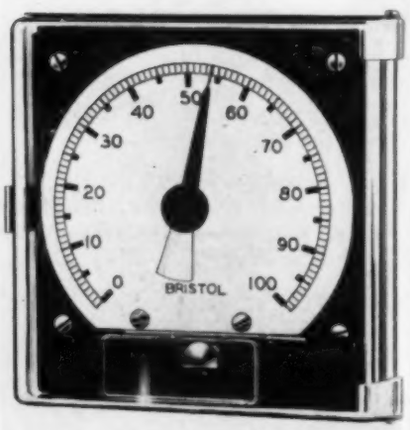
## Explosion-Proof Fixtures

For compact flush panel mounting in hazardous locations, a new line of explosion-proof, dust-tight condulets has been introduced by Crouse-Hinds Company.

Ideal for flow chart panels, Type EMP condulets combine explosion-proof construction with absolute minimum panel space requirements. For mounting on panel boards up to 1½ inches thick, these fixtures are secured firmly to the panels by locking nuts on the threaded necks for pilot lights, switch handles or pushbuttons.

Condulet bodies in rear of panel are fitted with 1-inch through-feed conduit hubs and large flat ground covers to provide maximum access to interiors. Visible parts at panel front have black instrument finish.

For more data circle **No. E9** on Readers' Service Card, last page this issue.

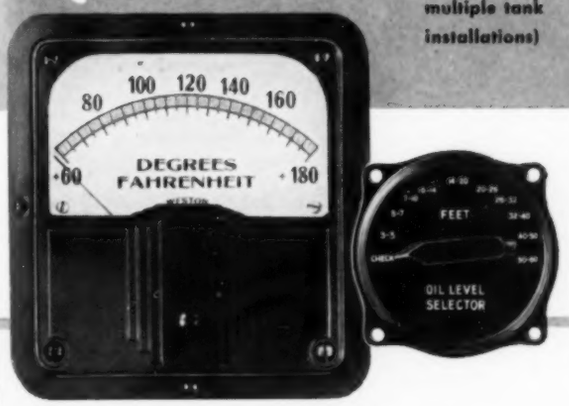



For more data circle **No. E10** on Readers' Service Card, last page this issue.

***Circle numbers on Readers' Service Cards on last page***

AVERAGE TANK TEMPERATURES INSTANTLY

(single or multiple tank installations)




WESTON AVERAGING RESISTANCE THERMOMETERS

*Time saving...Money saving!* You simply turn the selector switch to the oil depth, press the button, and directly read the *average* temperature of the oil in the tank. Time: *about one second flat!* Instruments can be mounted at base of tank, or at remote control points. For multiple tank installations special tank selector panels are supplied. For the complete story, write for bulletin... Weston Electrical Instrument Corporation, 614 Frelinghuysen Ave., Newark 5, N. J.—*a Subsidiary of Daystrom, Incorporated.*

*Send for your copy today!*

WESTON *Instruments*

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The efficient operation of your compressors — in fact, their *life* — depends on the removal of waste heat from lubricating oil and water cooling systems. The Whitlock Type SG Cooler is specially designed for such service. It is small yet capable of handling relatively high heat loads, and its standardized design means low cost and prompt shipment.

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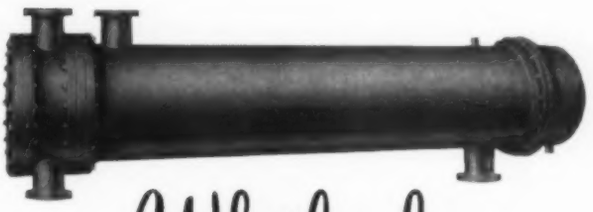

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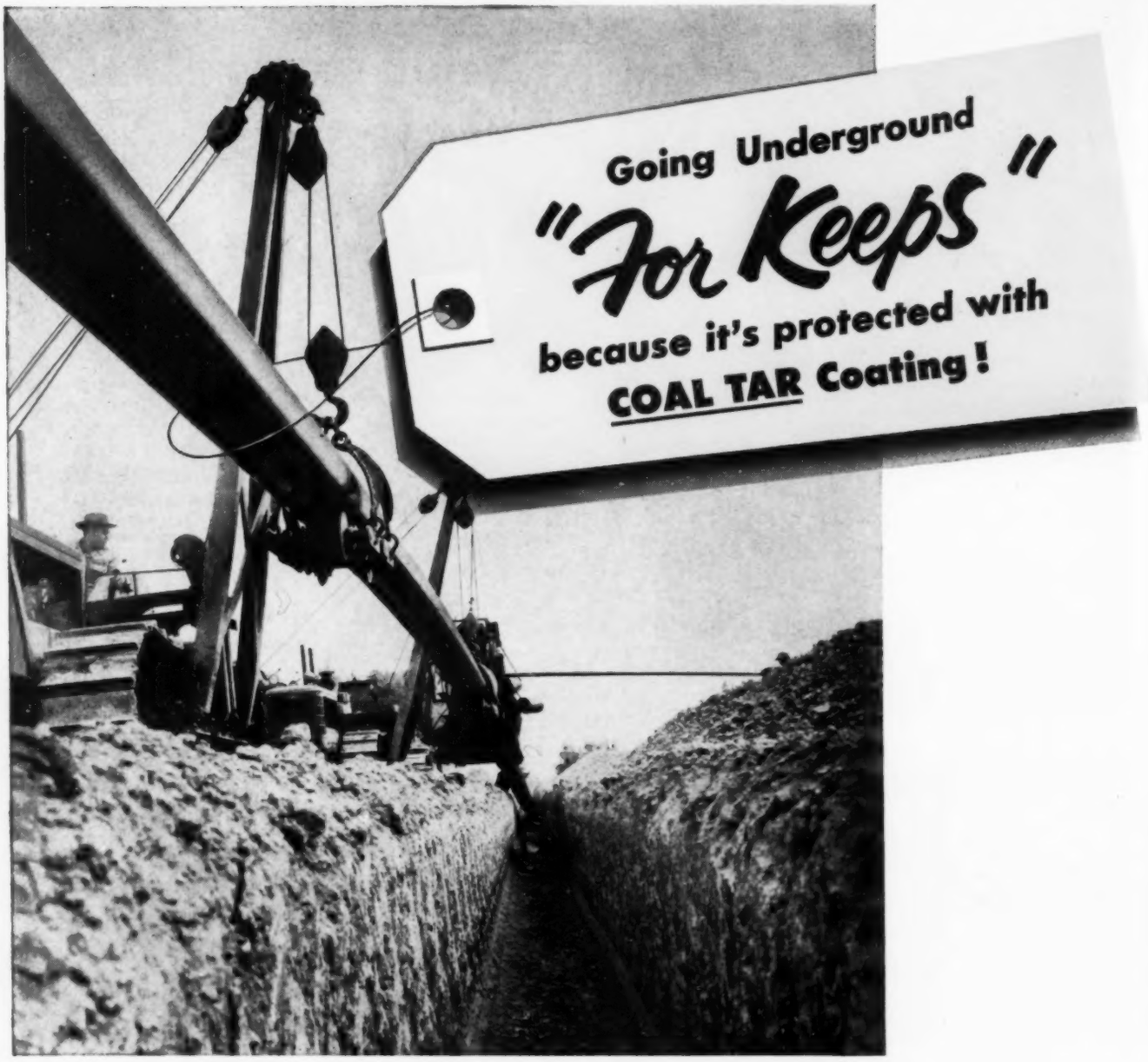


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# New Equipment Literature

**For more data on New Equipment or copies of Catalogs and Literature reviewed in this issue, use the Reader Service postcards just inside the back cover and facing the Advertisers Index. Simply circle code numbers of items desired—sign and mail card.**

## Plastic Pipe Data

United States Steel's national polyvinyl chloride pipe, its properties and applications, are described in a publication recently released by the company's National Tube Division. Corrosion resistant data are presented in table form, and temperature-pressure charts, flow charts and installation procedures are given in detail.

To get a copy circle **No. E11** on Readers' Service Card, last page this issue.

## Engine Maintenance Booklet

"Diesel and Gas Engine Lubricating and Fuel Oil Maintenance" is the title of a new bulletin published by The Hilliard Corporation. Oil contaminants are divided into two groups in this new analysis with recommendations for lubricating oil filters, either by-pass or full flow. A tabulated chart based on engine horsepower lists proper type and size of required oil filtering equipment needed.

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## Service Regulator Bulletin

A completely revised bulletin on "Rockwell Service Regulators" has been issued by Rockwell Manufacturing Company. New features of the bulletin include: cutaway-illustrated description of improved regular regulators and the new high-pressure model, both with 360-degree swivel connection assembly and side drain top covers; illustrated descriptions of four new Rockwell regulator products; and full-page rate-of-flow graphs illustrating mathematically determination of maximum outlet pressure build-up and amount of gas relieved to atmosphere by Rockwell "extra safety" devices in case of complete failure of a service regulator.

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## Firefighter Brochure

The Paris firefighter is sole topic of a brochure recently announced by Henry H. Paris Distributor, Inc. Describing uses, advantages and special features of the company's new unit, the brochure also includes numerous photos.

To get a copy circle **No. E14** on Readers' Service Card, last page this issue.

## Enamels and Primers Manual

A new service manual describing proper use and applications of pipe line enamels and primers is announced by Plico, Inc. The manual covers 27 steps of procedure and contains many specification tables.

Designed to provide a guide to proper procedures for cleaning, priming and coating of line pipe with hot applied asphaltic pipe enamels, the manual covers surface preparation, priming procedures and specifications, wrapping felts inspection, application, cleaning and removal of scale and slag, and pipe coating for river crossings and swampy lands. In addition, coverage data for primers and asphaltic enamels, as well as standard mathematical tables, are included for reference.

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## Protective Coatings Catalogs

Two illustrated catalogs, describing the Amercoat method of corrosion control, have been issued by Amercoat Corporation. One catalog is for the industrial construction field; the other, for plant maintenance engineers. Built-in corrosion control is theme of the construction catalog. Protective coatings systems are described which can incorporate corrosion resistance into a project by planning for their use prior to construction. The plant maintenance catalog describes corrosion control in the operating plant.

Various corrosion-resistant coatings systems manufactured by the company are outlined, as well as such additional services as guidance in choosing the proper protective coating, assistance in writing coating specifications, and on-the-job inspections during application.

In addition to maintenance coating systems, Amercoat manufactures a complete line of coatings to protect interiors of tanks containing corrosive chemicals. A list of such chemicals is given in the catalogs.

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## Cathodic Protection System

The Harco Corporation has announced publication of a technical brochure, "Cathodic Protection Systems for Corrosion Control." The publication describes corrosive effect caused by galvanic action of metals in contact with earth or water. Principles used by the Harco system to halt already existant corrosive action or to keep new installations free of significant corrosion damage is revealed and illustrated with drawings and photographs.

Resultant savings made possible by cathodically protecting underground pipe lines is discussed in one section of the brochure. In addition, over-all cost reduction on new installations effected by using pipe having minimum wall thickness and applying cathodic protection is revealed. Case histories present actual economies gained.

Another section of the publication notes increased operating life of equipment and elimination of down-time which the system makes possible. Both elevated water tanks and oil or other ground-contact reservoirs are discussed.

Engineering services are outlined in a final section of the brochure.

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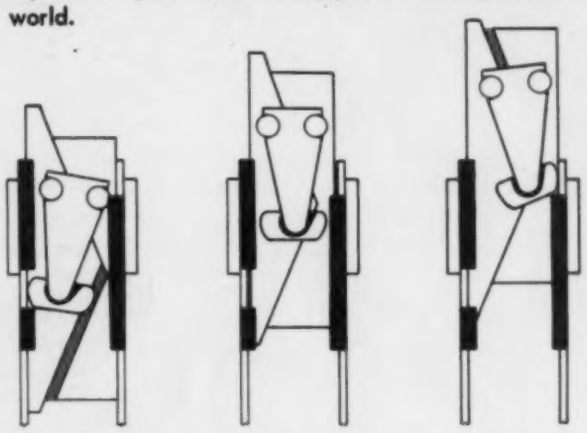

Fig. 1 Fig. 2 Fig. 3

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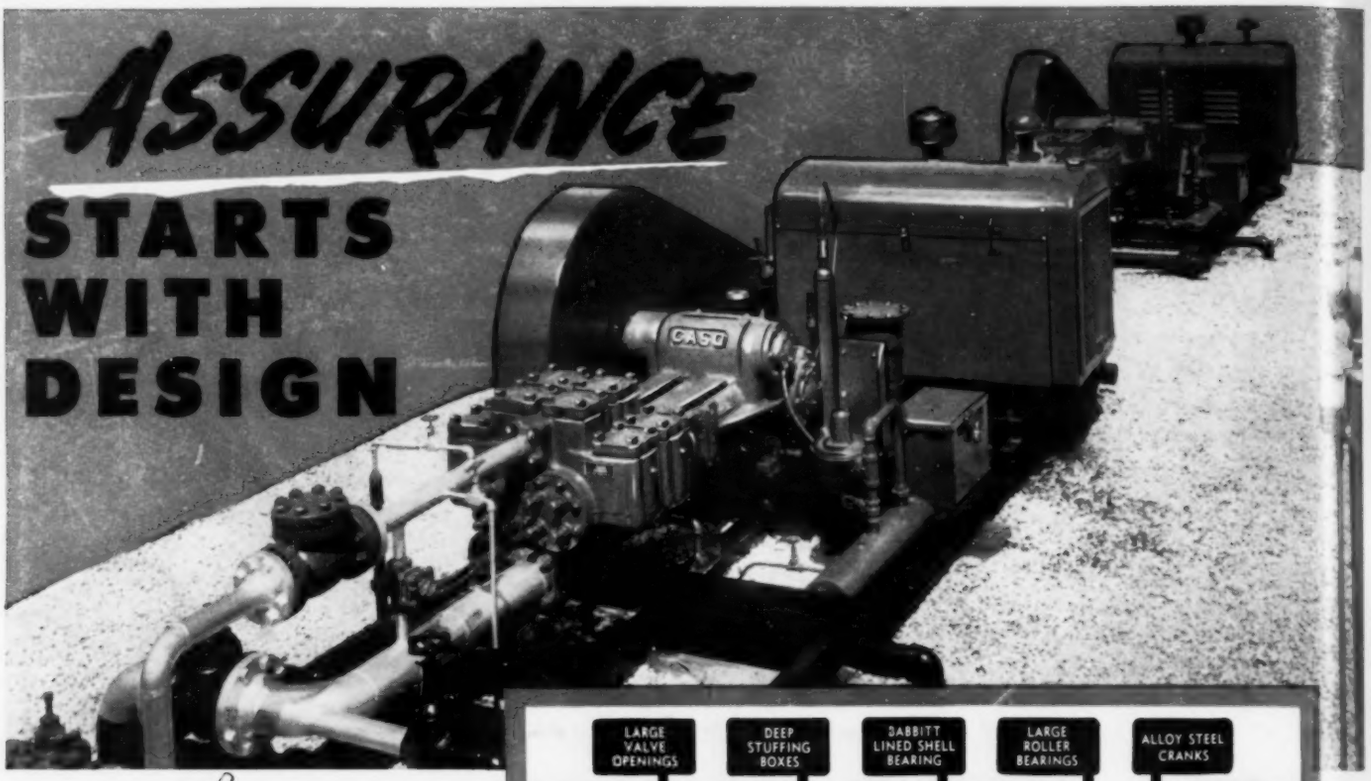

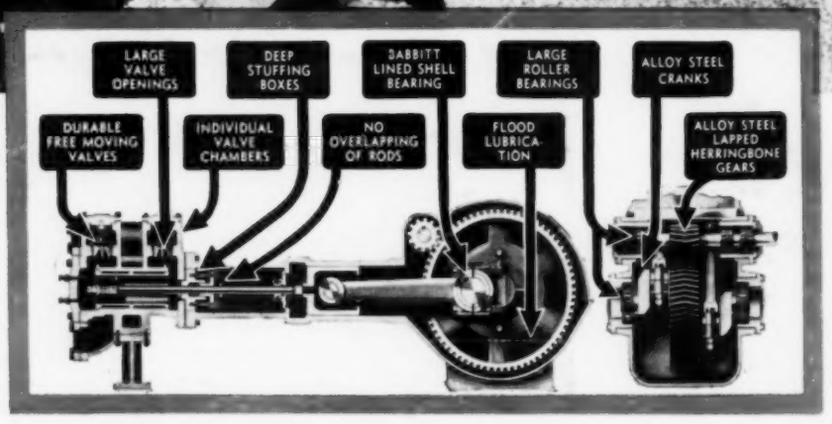


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